WORKSHOP

BEFORE THE

CALIFORNIA ENERGY RESOURCES CONSERVATION

AND DEVELOPMENT COMMISSION

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In the Matter of:           )
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Report to Governor:         )
Evaluation of Biomass-to-   )
Ethanol Fuel Potential in   )
California                  )
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CALIFORNIA ENERGY COMMISSION

HEARING ROOM A

1516 NINTH STREET

SACRAMENTO, CALIFORNIA

FRIDAY, SEPTEMBER 10, 1999

9:05 A.M.

Reported by:
Debi Baker
Contract No. 150-99-001

STAFF PRESENT

Pat R. Perez, Project Manager

Valentino Tiangco, Ph.D., Technical Lead and Project Manager

Tom MacDonald, Transportation Energy Specialist

Bill Blackburn, Alternative Fuels Program

Mike McCormack, Energy Technology Development

Elizabeth Parkhurst, Media and Public Communications

Nancy Deller, Energy Technology Development

Gordon Schremp, Energy Information and Analysis

ALSO PRESENT

James D. Kerstetter, Ph.D.,
Washington State University

Morris F. Scharff, Ph.D.,
Science Applications International Corporation

Stefan Unnasch, Manager, Fuels
Arcadis Geraghty & Miller, Inc.

Ron Landucci, Director, Process Systems Analysis
ProForma Systems, Inc.

Evan Edgar
California Refuse Removal Council

Kay Martin
County of Ventura

Sean R. Edgar
Total Compliance Management, Inc.

Catherine Witherspoon
California Air Resources Board

S. Kent Hoekman
Chevron Products Company

ALSO PRESENT

Steve Rick
California Air Resources Board

Darrell Harms
MASADA OxyNol

James R. "Rus" Miller, Chief Operating Officer
Arkenol, Inc.

Mark Yancey
National Renewable Energy Laboratory

Phil Cherry
Member of Public

Tasha Hamilton
California Environmental Research Group

Jessica Zhang
University of California at Davis

Tony Ashby
Sierra Research

Jonathan Carr
Strategic Finance Group

Michael Greene
CDS Consulting

Manuel Alvarez
Southern California Edison Company

Norm Hinman
BCI

Loyd Forrest
TSS Consultants

Fred Tornatore
F.A. Tornatore & Associates

Paul Wood
Ogden Energy

Dean Simeroth
California Air Resources Board

ALSO PRESENT

Bill Vance
California Environmental Protection Agency

John J. Chilcote, Director
Placer County Resource Conservation District
American River Watershed Institute

John J. Prevost, Director Environmental Services
The Pacific Lumber Company

David C. Allen
California Biomass Energy Alliance

W. Phillip Reese, Director
Colmac Energy, Inc.

Raphael Katzen, P.E., D.Ch.E, N.A.E., Consulting Engineer
RK-PE
Raphael Katzen & Associates

Selma Katzen

John D. Courtis
Daedalls Consulting

Curt Barry
Inside Cal/EPA

Neil Koehler
Parallel Products

Steven Shaffer
California Department of Food and Agriculture

Chris Trott
Ogden Power

Suanne Klahorst
University of California at Davis

Sharon Shaingker
University of California at Davis

Dan Howell
Ecosystem Management Consultants LLC

ALSO PRESENT

Bryan Jenkins
University of California at Davis

Jim Boyd, Energy Adviser
Secretary for Resources

I N D E X

I N D E X

P R O C E E D I N G S

9:05 a.m.

MR. PEREZ: Welcome to the California Energy Commission and a Staff Workshop on the evaluation of biomass-to-ethanol fuel potential for the State of California.

My name is Pat Perez; I am the Project Manager in responding to the Governor's Executive Order on the biomass-to-ethanol component of what is called Decision 5-99 from California Governor Gray Davis.

And to my left is the staff and the consultants that assisted us in preparing the report that we are here today to discuss.

What I want to do before we really get started is go through a few introductions, as well as find out in the audience how many of you have to leave early today, like early in the afternoon, so that we can take your comments this morning. Can I see a show of hands of those who would like to speak this morning? Four, okay. Great, we'll try to get you scheduled in this morning.

With that, let me go through introductions. I'd also like to have everybody in the audience introduce themselves, as well as their affiliation or organization before we get started.

With that, let me start with Dr. Val Tiangco from staff. And continue down the line.

DR. SCHARFF: Mo Scharff from SAIC, consulting on this project.

MR. MacDONALD: Tom MacDonald, Energy Commission Staff.

MR. BLACKBURN: Bill Blackburn, Energy Commission.

MR. McCORMACK: Mike McCormack, Energy Commission.

MR. UNNASCH: Stefan Unnasch, Arcadis Geraghty and Miller.

MR. LANDUCCI: Ron Landucci, ProForma Systems.

MR. EDGAR: Evan Edgar, California Refuse Removal Council on behalf of the private, independent -- California.

MS. MARTIN: I'm Kay Martin with the County of Ventura.

MR. EDGAR: Sean Edgar, Total Compliance Management, Incorporated, providing services to solid waste companies, as well as independent retailer with Shell Oil Products Company.

MS. WITHERSPOON: Catherine Witherspoon, Air Resources Board.

MR. HOEKMAN: I'm Kent Hoekman from Chevron; I also served on the Peer Review Committee for this report.

MR. RICK: Steve Rick, California Air Resources Board.

MR. HARMS: Darrell Harms, MASADA.

MR. MILLER: Rus Miller, Arkenol.

MR. YANCEY: Mark Yancey, National Renewable Energy Laboratory.

MS. PARKHURST: Elizabeth Parkhurst, Energy Commission.

PHIL CHERRY: Phil Cherry, personal interest.

MS. HAMILTON: Tasha Hamilton, California Environmental Research Group.

MS. ZHANG: Jessica Zhang, University of California at Davis.

MR. ASHBY: Tony Ashby, Sierra Research, air pollution control consultants.

MR. CARR: Jonathan Carr, Strategic Finance Group.

MR. GREENE: Mike Greene, CDS Consulting.

MR. ALVAREZ: Manuel Alvarez, Southern California Edison.

MR. HINMAN: Norm Hinman, BCI, developing two biomass projects in the state.

MR. FORREST: Loyd Forrest, TSS Consultants.

MR. TORNATORE: Fred Tornatore, CEQA consultant.

MR. WOOD: Paul Wood, Ogden Energy.

MR. SIMEROTH: Dean Simeroth, Air Resources Board.

MR. VANCE: Bill Vance, CalEPA.

MS. DELLER: Nancy Deller, Energy Commission.

MR. CHILCOTE: John Chilcote, Placer County Resource Conservation District. Director. And also Director of the American River Watershed Institute.

MR. PREVOST: John Prevost, Pacific Lumber.

MR. ALLEN: Dave Allen, California Biomass Energy Alliance.

MR. REESE: Phil Reese with Colmac Energy. We own the newest largest biomass plant in the state.

DR. KERSTETTER: Jim Kerstetter, Washington State.

DR. KATZEN: Ray Katzen, Consulting Engineer; Raphael Katzen & Associates, Designers of ethanol plants -- biomass.

MS. KATZEN: Selma Katzen.

MR. PEREZ: Well, thank you very much. I can see that we have a very diverse group of interests here today, and I'm sure we'll all benefit from this discussion, particularly this afternoon when we move into a more interactive session.

I also want you to know that we are sending a sign-in sheet around so that we can get all your names and addresses, add you to our stakeholders list to keep you informed as this report develops to a final report in December. And also to assist our court reporter over here with the correct spelling of your name should you wish to speak up this afternoon. And I would encourage you to do that, because we very much want to hear from all of you out there.

A few other things. I would like to briefly go over the agenda, what we're going to cover today. And maybe we can start with the agenda up here.

I hope all of you have a copy of the agenda. They were provided out on the table. There's actually a variety of items out there that I hope you have in hand. That includes the agenda, as well as an errata sheet to the August 13th draft report.

Also, if you don't have it, the workshop notice is out there; it lays out the purpose of what we're here for today. And then also all the written comments that we have received to date on the report, material that we had received as of last night.

So, we've assembled all those comments. We have not made any changes to them. They are also out there for your review and will be considered and incorporated, perhaps, in our next draft, after we get a chance to look at it.

Okay, may I have the next slide, please. The first major change that I'd like to point out. We were going to have Commissioner Michal Moore here today. He extends his deepest regards for not being able to be here. Early this morning he was pulled into two other meetings, and may be joining us after 10:00 this morning.

So, again, I want to pass on my deepest regards, I did talk to him. He very much wanted to be here this morning but was unable to be here. And his Advisors have also been pulled away this morning with him. So they will not be here.

Just running down the list here, I'm going to deliver to you a presentation on our recommendations, findings, kind of discuss and provide a brief overview, and discuss some of the process that we went through to arrive at the August 13th draft.

Following my presentation we have an expert witness presenter, Dr. Jim Kerstetter, Washington State University, who's had vast experience in the ethanol industry, and is actually a former Energy Commission employee back in the early 1980s. So he will be speaking.

Following his presentation I'm going to open it to public comment. And, as well as try to squeeze in those more formal presentations that some of you may have, particularly those individuals that have to leave by early this afternoon or by noon. I'd like to get their comments early in the process.

And then we'll have a one-hour lunch,

and then move into continuing discussion on the staff report, as well as the eight questions that we've outlined in the workshop notice.

And, again, many of those questions relate to the second aspect of the Governor's Executive Order, in terms of directing us to look at what steps could we possibly take to foster biomass-to-ethanol industry in California, and more the broader policy questions on whether or not we should have a policy to facilitate that.

So I think that's where a lot of the lively discussion will probably take place this afternoon, because there's very little discussion of that in the draft report. We did that intentionally because we felt that it would be more valuable to have an interchange and input from the public in a setting such as this to develop that portion of the report.

After that any other more formal presentations we'll entertain this afternoon for those of you who can afford to stick around for the entire day, we'll hear those presentations.

And then we'll wrap it up with concluding remarks, as well as outline the next steps, where do we go from now. Some of those next steps, particularly with regard to our schedule, I'll be discussing in my overview presentation here in a minute.

So, with that, before I launch into the presentation, are there any questions right now? Okay, not seeing any, I think we'll move right into the presentation.

What I would like to do today, several things, and that is, one, provide a brief overview of the state's phase out of MTBE. And specifically what is in the Executive Order that was issued last March. Also talk about the CEC's, California Energy Commission's responsibility with respect to the ethanol portion of that Executive Order.

And then share with you some of the preliminary report findings, as well as the conclusions, and some of the preliminary recommendations we have to date. And, again, I stress the word preliminary because this is a report that is in evolution and will be modified based on the input we receive from all of you, as well as people that are sending in comments that are not with us today.

And then identify some of the areas that staff, as well as some of you, have identified that require further study and analysis. I'll be going through some of those areas and identifying them for you.

And, again, this will be very helpful in putting together a draft final report that we'll be delivering to our Fuels and Transportation Committee that oversees our work here at the California Energy Commission in late October.

Regarding the Executive Order that was released last March, the Governor determined a variety of things. One of them is that MTBE posed a threat to surface water, groundwater, and drinking water. And that it may present potential health problems.

And another major finding is that reformulated gasoline can be produced without using MTBE. And these findings essentially laid the foundation for an 11-point Governor's Executive Order which is contained in our draft report.

I'm not going to go through all 11 points, because today we're here to focus on the one aspect of the Executive Order that pertains to the report that we've put together for you.

So, may I have the next slide, please. Regarding the Energy Commission's responsibilities under this Executive Order, one, we were asked to coordinate activities with four other state agencies for implementing the Executive Order. Those other state agencies are the California Air Resources Board, the Water Resources Control Board, Office of Environmental Hazard Assessment, and the Department of Health Services.

And that effort is being led and really coordinated by Bill Vance at CalEPA, who was here earlier, over here on the side. He's having a very challenging task coordinating all of our efforts, but doing a very good job. We're very pleased to have him here today with us.

Also we were asked to develop a timetable by July 1st for removal of MTBE in gasoline. That is work that is being done in another office here at the California Energy Commission that has been completed on time.

And then finally work with California Air Resources Board and petroleum industry to supply MTBE-free gasoline year-round up in the Lake Tahoe region. And that work is under way. And I think many of you are familiar with what's going on there. It's been very visible in the press.

May I have the next slide, please. This is verbatim what we've been directed to do from the Governor's Executive Order. And that is to evaluate by December 31st of this year, and report back to both the Governor and the Secretary for Environmental Protection, the potential for development of a California waste-based or other biomass ethanol industry.

And then secondly, evaluate what steps, if any, would be appropriate to foster waste-based or other biomass development in California should ethanol be an acceptable substitute for MTBE.

And I would caution that we're not prejudging the outcome of studies that are being done by other state agencies that are looking at the environmental and public health issues surrounding the use of ethanol. That is being done outside this forum.

But we're going to go ahead and lay out recommendations and suggestions anyway, in the event that they find that there are no significant problems. So that at least it will be in place by the end of the year for the Governor to consider.

Next slide, please. In putting together this report, we benefitted immensely from input and comments received from a Peer review group that we had created. And basically in an effort to improve the quality of our report we developed a group representing a broad diverse group of individuals with knowledge and involvement in alternative fuels, as well as biomass and ethanol, to assist us in getting to where we are today.

In fact, we put together a working draft report back in mid July and sent it out to this Peer review group that I have outlined up here. And they actually reviewed the report, provided additional comments, and we incorporated those comments where possible. And they've been reflected in this report.

I might add, however, that in that working draft report that we released in July, it did not contain an executive summary, recommendations and so forth, because we were a long way from reaching really firm conclusions and recommendations at that point in time. So they did not see that portion of the report that is contained in the draft that you have today.

Actually, can I see a show of hands of

our Peer review members that are here today, just so you can see who they are. Three of them here. And hopefully we'll have a few more joining us later today. We really appreciate your input.

Okay, next slide, please. As I mentioned earlier, we have received written comments on the August 13th draft report that is right here that most of you have copies. I'm not going to go through those comments, but many of them have been received last night or in the last couple of days.

But I just want to acknowledge for you who they are, and that's comments from Rus Miller of Arkenol; Don Kornreich from the Board of Supervisors, Nevada/Tahoe Conservation District; Todd Sneller, Raphael Katzen, James McElvaney. Not listed up there, but we've also received comments from the California Air Resources Board, Dean Simeroth; Howard Rosen from the U.S. Forest Service; Dr. Charles Stokes from Charles Stokes Associates.

Those comments are contained in the package that is in back that hopefully all of you have picked up. There's additional copies in back. And I have received some additional comments this morning which we'll try to get those reproduced and out to you today.

So those are the comments. I'm also anticipating receiving additional comments today, as well as next week. I've had numerous phone calls from people that could not be here today that will be sending written comments to us.

May I have the next slide, please. Regarding the activities that have been completed, I've already gone over the fact that the Governor released his Executive Order back in March. We had an annotated outline that is also included, I believe, in the appendices of our report that laid the scope of our activities in putting this report together. That was approved by our Fuels and Transportation Committee back in June.

And from June, for the past August 13, that nine-week period is when staff put together this report.

Next slide, please. Regarding where we're going with the report, obviously today you're all here for the public workshop. We plan on taking your input, reviewing it, and making necessary adjustments to the report. And releasing another public draft on October 22nd.

So that is our target date for releasing one more report.

Also with that report we plan on releasing a Fuels and Transportation Committee public hearing notice. This will be a more formal hearing before the two Commissioners, Commissioner Pernell and Commissioner Moore, that is tentatively set up for November 19th, which is a Friday. That date may change. The Commission actually has two other major hearings during that week, and I don't know if we're going to be able to squeeze it in. It could actually get moved up to Monday of that week, so we'll keep you posted on that.

All of our material, by the way, is posted on the internet under the MTBE website. And I'll give you that address later today.

Following the November 19th public hearing, we'll probably be directed by the Committee to perhaps make additional changes to the staff report based on public comments, as well as review and input from our own Commissioners here.

And then we'll release another draft that will be presented before the entire

California Energy Commission, which is made up of five Commissioners, for possible adoption on December 15th at a business meeting, which is the last business meeting of the year.

Hopefully that will get adopted. And it will move on to the Governor. As well as the CalEPA the following week, because it is due to the Governor by December 31st. So kind of give you an idea of where we're going.

Regarding the report, itself, and the scope, let me just briefly describe the scope of the study and what we did. And that was, one, to evaluate waste biomass resources in California, as well as talk about some of the benefits, as well as the challenges that are out there that must be overcome, if indeed we are to attain and achieve some of the benefits that we've outlined, and that I'll discuss in greater detail later.

Also we felt that it was important to assess the energy potential in California as a potential competitor out there, and so we have a chapter on the energy crop potential because we see that as being something, particularly for the long term, beyond 2010, 2011, as a very viable option that may be pursued that could also offer tremendous opportunities for producing ethanol.

Also, we reviewed a number of biomass-to-ethanol conversion process technologies, and relied heavily on the work done by National Renewable Energy Lab and DOE and the Universities in putting together our staff report. And much of that is discussed in the report, as well as in the technical indices.

And, also, we were asked to come up with some gross estimates on biomass-to-ethanol production potential based on the biomass resources that we have out in California, and we have done that.

And we have also covered in the report some of the most active proposals that are under discussion and in various planning stages within California. We have some of the representatives in the audience today representing them. The Gridley Project, the Collins Pines Project, or often known as the Quincy Project, as well as Arkenol. And so you'll see some discussion there. And we'll be expanding on that discussion in the report.

Next slide, please. Some of the other critical areas was we examined the economics of biomass-to-ethanol production. We also looked at conventional as well as advanced corn-based ethanol production processes from the Midwest, as well as looked at what is being done up in Canada, as competitive benchmarks to any prospective industry that may emerge here in California.

And we did retain ProForma down here at the end of my table, Mr. Landucci, who evaluated a variety of ethanol production economic scenarios. In fact, we ran 60 different scenarios looking at stand-alone ethanol production facilities, as well as co-location of ethanol facilities with biomass power plants to look at the overall economics and the cost and benefits that would be derived from that. As well as we looked at a variety of different feedstocks in these scenarios, as well as a variety of different production conversion process technologies. And a host of different plant sizes, so that we could get a reasonable range of what may possibly emerge here in California.

We also identified some of the major challenges that could affect the biomass-to-ethanol industry in California. And we also offered a few potential actions that California government and other entities could perhaps pursue to aid the development of such an industry here in California.

May I have the next slide, please. Some of the key findings, some of which are obvious to you, but I think it's important to also highlight them, is that virtually all of the ethanol produced in the United States today is from Midwest corn. And will continue to be the case for the near term. And by the near term I'm looking at the next, you know, two to three years.

Because even if the California facilities come on line, we're looking at two to three years before they're possibly up and running. So we see that continuing to be the case.

Also, through our assessment of the California Waste Biomass Resources, we're showing that there are about 50 million bone dry tons of these resources for potential ethanol feedstock in the state. And that actually if you were to expand that beyond the traditional waste biomass sources and looked at livestock manure, for instance, that could go up to 60, 63 million bone dry tons.

So I'll just kind of give you an idea, so there's tremendous quantities of biomass potential out there. Not all of it, of course, is accessible or economic to extract and go after. But that's the physical quantity of biomass material that we have been able to identify through our analysis and studies.

Also, of that, 40 percent is from forest waste or residues; 36 percent is from municipal solid waste; and the remaining, as we see it, is from a variety of agricultural sources.

And then if you were to simply take a calculation of taking 70 gallons/ton conversion rate, we can come up with what's called our theoretical upper limit of waste-derived ethanol, which we're seeing at around 3.5 billion gallons per year.

So, again, that is before you factor in economic, technical and other constraints. That's physically what can be extractable out there. But the actual amount, once you factor in the cost of going after it, it's going to be significantly less.

In fact, that is the point of my next slide, if I can have that, is that amount actually gets reduced significantly, and we're still working to arrive at those lower numbers once you factor in institutional siting constraints, economic cost of going after these resources.

On the other hand, if the three proposals that I mentioned earlier come on board, we could have roughly 44 million gallons a year of ethanol in addition to the 6 that is currently being produced down in southern California. That would give us a total of 50 million gallons of ethanol by the year 2004.

Next point is that energy crops, as I mentioned earlier, could produce even more ethanol over the long term, but currently there appears to be no plans that we're aware of to utilize energy crops on a large scale to produce ethanol in this state. So perhaps we'll be hearing from you today, from some of you out there, that indeed there are plans out there, but we're not aware of any really firm plans in the short term to produce ethanol from energy crops in California.

Although we did give it, in my mind, significant treatment in the report, because we see it as a viable option that should be considered for the long term.

Additional findings -- we'll have the next slide. Our analysis shows that ethanol will continue to require subsidies such as the federal 54-cent-a-gallon tax subsidy. We see that continuing, and very crucial for this industry.

There are also the outcome of the Feinstein bill as well as gasoline fuel specifications could significantly impact the market for ethanol in California. And we are monitoring those developments closely, as I know many of you are, too.

Also, additional markets for neat ethanol for such as our E-85 vehicles, the ethanol flexible fuel vehicles may emerge, too. And I think what's important about that is the fact that should that happen, a larger market will also arise and perhaps create additional demand for ethanol that could also benefit the biomass-to-ethanol industry, because it's critical to have a large market or a growing market to support this industry in our minds.

Next slide, please. Another finding is that several process technologies appear to be economically comparable. The success of their deployment, however, will depend on process improvements which have been occurring for some time now.

Many of you are familiar with ENREL's work. You're very aware of the fact that these technologies have increased significantly and the costs have come down dramatically over the time with both two-stage dilute acid, as well as the acid enzyme technologies that we've discussed in our report.

Also, at this time it is very difficult to estimate biomass-derived ethanol production costs, but we do believe that the production costs over the long term will continue to fall as a result of improved yields from these technologies, as well as reduced costs for the feedstocks and the enzymes, as well as the possible addition of value-added co-products to at least improve the economics of these facilities.

Also through our economic analysis, at least over the long term, we're finding that all these technologies using biomass residues can deliver ethanol at a price under $1 per gallon when co-located with power production.

And I think it's very important when we looked at the variety of scenarios in this economic analysis that particularly when you co-locate the overall capital cost can be reduced by up to 30 percent, so there's tremendous savings there by co-locating with an existing biomass power plant.

There's obvious other benefits with shared infrastructure for these facilities, too, that would cost you a lot more by having two separate facilities. That is why we conducted additional scenario work, looking at co-location versus stand-alone facilities, to get a better feel on the range of costs, as well as prices. So that we could cover what I would consider a more reasonable range of technologies.

Our economic evaluation indicates that waste biomass-to-ethanol technologies can produce ethanol at a competitive cost with corn-derived ethanol from Midwest states, we believe, over the long term. But we're also very aware of the fact that there are significant improvements in these corn-derived technologies, as well as the advanced corn derived process technologies that are underway, too.

And so we'll see improvements and advancements in the Midwest simultaneously, too, with the work that is being done in the biomass-to-ethanol industry, and their respective technologies.

Also, we find that there are significant environmental benefits that can be realized from using waste resources. There is considerable uncertainty that exists in the potential growth for ethanol use, due to the lack of market experience and pending regulations.

Also, that critical factors for biomass-to-ethanol industry, as we see it, are, one, the availability of capital; and secondly, ability to obtain long-term, low-cost feedstocks. Very important and significant.

Moving on to some of the challenges as we see it to date, facing this emerging technology is, one, like with any technology that is new, that has not yet been demonstrated at a commercial scale, you have high production costs, and the capital requirements are enormous.

There's also difficulty in securing financing, as many of you know, running to the banks on new technologies. The risks are high, and as a result the costs for obtaining financing to cover those risks is high.

And then the uncertainty with motor fuel regulations. For example, here in California we have some of our regulations that are currently being reviewed over at the California Air Resources Board, and those decisions will not be made until the end of this year. So that also presents uncertainties before somebody can make major investments. You'd like to know what the future requirement are going to be for the gasoline, particularly the blending requirements.

Also, as we've heard in our previous hearings on the MTBE issue, there are what we consider significant infrastructure distribution and storage challenges here in California for the mixing of ethanol and gasoline, and all, that need to be addressed.

California has unique siting requirements that don't necessarily exist in the rest of the country, and particularly in the Midwest. It could take a little bit longer to get approvals for making major refinery changes, as well as terminal upgrades and so forth, to accommodate the changes, as well as the transfer and distribution of ethanol through pipelines, for example. So, those need to be recognized and dealt with.

Some additional challenges. As I mentioned early, the lack of commercial scale experience with biomass-to-ethanol process technologies is a major challenge. And local permitting and siting requirements here in California. And the ability to obtain consistent low-cost feedstock, particularly as you use up the cheaper feedstocks that are closer to the facilities that you're going to be, perhaps, developing as you move further away, the transportation costs get very high in terms of bringing in these feedstocks.

I'd also finally like to add that without an ethanol market it would be extremely difficult to finance these ethanol projects. So you've got to have a market out there to really stimulate this industry.

With that, now that I've covered some of the major challenges as we see them, I'd like to spend a moment talking about some of the potential benefits that could be derived from such an industry, and we can overcome some of the challenges that are out there.

And that is that by using a renewable

fuel, biomass-to-ethanol, we have the potential of reducing greenhouse gas emissions, and our contribution to global climate change, so that is something we have addressed in the report.

Also the potential for improvement in forest health, the reduction of wildfire fuels, as well as waste, residues in the forest, and I think it hits pretty close to heart, if you look at some of the major forest fires we've had here in the last weeks, there's, I believe it's over $1 billion in firefighting costs, just to the state here, on an annual basis in terms of fighting fires. That's a tremendous cost, and this industry offers some potential to at least minimize some of that by using forest waste for ethanol production, at least improving overall forest health at the same time.

As well as diversion of waste materials from landfills. We see that as another major benefit. And also some of the benefits to our rural economies, as well as our agricultural areas that tend to have some of the greatest unemployment levels, although they're not real significant during these more economic good times, but they're still higher than some of the more urban areas of our state.

So we see some positive impacts that could at least result from an industry being developed in terms of employment impacts and tax revenue impacts, too.

Additional benefits are improved air quality by reducing open field burning of rice straw. A very big big issue here if we're to maintain our rice industry and how to best dispose of that with our well known air quality problems. And the California Air Resources Board is involved in that issue very much. And you'll be hearing more about that later today in some of the comments you'll probably hear from Mr. Simeroth.

Also it is a domestically produced renewable fuel and a nonpetroleum based fuel source, too, consistent within our California Energy Commission objectives to diversify our fuel base to be consistent with Commission policy, too. So there's benefits there.

Moving on to some of our preliminary conclusions and recommendations. We have discussed this for hours amongst ourselves and then at the staff level, and we feel that it is very important that if we do decide to move forward with such an industry that we need a clear integrated biomass-to-ethanol policy at the state to really guide any activities that we may wish to endeavor or pursue in supporting such an industry.

And much of this will be the focus of this afternoon's discussion. And it is one of the very questions we outlined for you in our public workshop notice, and we definitely would like to have your input on that.

Secondly, we feel that it would be appropriate to recommend that we change the Integrated Waste Management Act to get full credit for state waste diversion goals. That will also assist this industry.

And it may also be appropriate for the state to partially fund some of these first facilities that may be developed or constructed in California's demonstrations before we launch forward with full scale support, so that we can measure the results, as well as get some real time experience, operating experience with these facilities, as well as the cost.

So that is one of the things that we are recommending before we get large scale commitment to such an industry, we feel that it is very prudent to first get a couple of these facilities up and operating, and see how they actually operate and run before we make that larger commitment.

Also like to, just for a moment, identify for you some of the outstanding areas that we need to work on in our next iteration of this draft report.

We also, as I mentioned earlier, are going to beef up the discussions on the three most prominent proposals that are before us here in California that may actually lead to real physical projects out there.

Expand a little bit on the municipal solid waste diversion credit and expand our discussion on the potential relationship of biomass-derived-ethanol and the greenhouse gas emission benefits and relationships.

We feel that that area, based on our own internal discussion as well as comments we've received from the public, that that's an area that could benefit from some additional discussion.

A couple other things that we plan on doing is providing some additional information on food processing, ways to get cull fruits, potential sources of biomass. And expanding our discussion on synthetically produced ethanol. And adding information on the potential to produce ethanol from livestock manure, digested solids is another area that we'll be looking on.

We're also -- I've had discussions, as well as received input, from people in the methanol industry asking about the question of using methanol. And so that will be discussed. I believe we have a speaker here today that will be at least highlighting some of the issues using methanol, perhaps, for blending with gasoline.

A few more outstanding areas that we need to clarify, some of the biomass conversion processes that apply to waste-based and energy crop feedstocks. We'll be working to beef up our discussion on that, and hopefully making a little clearer to the reader what we're talking about.

Also, the inclusion of the crop-based ethanol potential, trying to come up with some better numbers there and expanding the discussion on the existing network of biomass power plants that we did not, in our mind, give sufficient treatment to.

And then expanding the discussion on the environmental and siting requirements for these new production facilities like any other major facilities that do face permitting, siting challenges and constraints perhaps. And we need to identify the decision-making processes some of these many have to go through before they are constructed and built here in California.

So those are the major issues that you've identified that will be included in the next iteration. And then input that we receive from all of you today will, of course, also be considered in the rewrite of that draft report before it goes out in October.

And with that, what I'd like to do is turn it over to Dr. Kerstetter to share with us some of his oversight on this industry, as well as any comments he has regarding staff's report.

And following his presentation, I'm going to open it up to public comment. So you'll have an opportunity to ask any questions of what I have just gone over, as well as zero in on the specifics of the report, itself. And I do have all my technical staff that co-authored this report, as well as the chief consultants that contributed to the economics chapter, as well as to the process conversion technologies chapter on this report.

So, with that, I'd like to please welcome Dr. Kerstetter. And, if you'd like, come up to the mike. Turn that on.

DR. KERSTETTER: I think I'll show my -- I have some overheads.

MR. PEREZ: Oh, okay.

DR. KERSTETTER: I think I can work them, I'd rather work them.

MR. PEREZ: Sure.

DR. KERSTETTER: Pat and the Committee, thank you for inviting me down here. It's been awhile since I've been back at the Commission. I left in 1983, started here in 1980.

What I want to do is just share some perspectives of working for 22 years in the biomass area, working in California here for three years on the methanol program, and recently working up in Washington State, so share some things that we've observed up in Washington State, also.

So it's going to be a mix of some historical perspectives, my personal views, they're not the views of Washington State

University. Things that I've experienced over the years.

Senate Bill 620, 1980; staff report December '81. The program started in 1980, we were in an energy crisis, fuel shortages, fuel concerns. California had a program for both vehicles and production.

I was hired on to be in charge of the program for production. I think it was a $4 million program that provided for feasibility studies and/or construction.

And we funded a number of feasibility studies, one construction project. After two and a half years I wrote a memo saying this going to make it out here in California, guys, we're not going to compete with grain-based systems producing ethanol in the State of California. The economics weren't there.

We had some proposals on biomass-to-ethanol with enzymes in 1980/81. Determination was made they were not ready for construction. One of them was the California process over in Richmond, a bricks process. And we evaluated that process at that time. And the economics weren't there, and feasible.

This is a copy from the report -- I should have blown that up, I'm sorry.

MR. PEREZ: Let me just jump in, Dr. Kerstetter.

DR. KERSTETTER: Yeah.

MR. PEREZ: We do have copies in the back of this presentation, so feel free to -- maybe we can just pause for a moment and bring those out. Because this is rather difficult to read, I believe, so why don't I bring out --

DR. KERSTETTER: Yeah, it might be best. Yeah, I did make a hard copy of this, just turned it in this morning.

(Pause.)

MR. PEREZ: Okay, you can proceed, if you like.

DR. KERSTETTER: Okay. Some of the conclusions made in this December '81 which are not earth-shaking, they're the same conclusions somebody would draw today, somebody would draw ten years from now. You need viable markets. If you're going to have a successful system you need markets. Somebody has to buy your product.

And if you're going to produce co-products and byproducts, you need viable markets for that. Co-products look nice on a piece of white paper, but trying to get into the marketplace can be exceedingly difficult.

Just because you produce a product or a co-product, the same as somebody else produces, doesn't mean you have your place in the market.

There's established markets and it's hard to enter in established markets with a new source of materials.

Production costs obviously have to be lower than the marketprice. Or some incentive or subsidy in place to make that happen.

Production facilities obviously have to be environmental regulations and not suggest at all that you waive environmental concerns; you're dealing with environmental problems, they have to meet the regulations for their -- also take advantage of benefits and government incentives in place is really dealing with the economics.

The second, market setting, is you need markets. Without a secure market you're not going to get financing. It's just a critical issue. The electric industry faced that on the biomass power side, so you had Standard Offer No. 4 where the utilities would buy that power, you couldn't finance the plants, it was very difficult to finance the plants.

Unless you have a market you're not going to get the finance. It's going to be extremely difficult to finance.

And the bottom part I'll just skip over, you know, grow your own feedstock, which was 1980, the idea was there. Energy crops. Control your cost if you can, you know. Use waste products. This time we were actually looking at, based on agricultural process, because the first plant built here was waste raisins, so use low cost energy crops.

And incorporate cogeneration. Nothing new since 1981. Basically we're coming to the same basic conclusions as we did then.

And, again, from my point, feedstocks, if you can't get feedstocks at a reasonable cost you're going to have great difficulty getting a facility.

Two major things, markets for the product; feedstocks at a reasonable cost.

Again, some personal views, what's happened since the SB-620 project. Corn is still the predominate feedstock and it still sells at

$2.50 a bushel. It's just amazing. 1981, 1999, corn selling at the same price as it did then. Something's happened obviously in the farming industry if they're still producing at $2.50 a bushel and they were producing at $2.50 a bushel in 1981.

Productivity is obviously one of those things. It's a major competitor. Ethanol is now marketed as an octane and oxygenate. When we had our program in 1980 it was a fuel extender. We were in the energy crisis, how are we going to get more liquid fuels into the marketing system. Produce ethanol leaded at 10 percent, you get a 10 percent displacement of the fuel -- it's valued as an extender as the value of gasoline.

If you can get it, market it as an oxygenate, you're competing against MTBE. If you're getting it in valued as an octane enhancer, you're competing against in-refinery processes. Whether they can not be refining down and get the octane back with ethanol.

So you can get added value, which is one thing that has been captured to an extent, since 1980.

And biomass-to-ethanol, biomass, itself, and ethanol has still not been commercially demonstrated.

What has happened with biomass -- couple feasibility studies, is there have been significant increases in the yields of biomass and in the gallons of ethanol -- through a lot of -- and pretreatment processes, increased kinetics, faster reaction rates, and recently being able to capture the fractions, so more yield, so the feedstock cost effectively becomes a little bit lower.

Debit and improvement process energy requirements have declined. They've become more efficient. Ray Katzen -- making that happen -- and another thing that's happened is global climate change has become an issue. It's become an issue in the world outside of the U.S., outside of California, but it is an international issue that has to be dealt with.

Pat mentioned, and I think it's important to keep in mind, the biomass industry has improved its yields, so has the corn industry. Nothing is static, other things change. So we can't take a snapshot of one and say this is where they're at, but we're going down here. Because they're getting better, too.

The petroleum industry is getting better. There's improvements all across the board. It's not just the biomass industry. So we shouldn't lose sight of we're doing a great job, so are the other people. There's competition.

What's happened to gasoline prices. We were in the '80s here, the prices; this is historical prices, you know, draw a straight line, gasoline prices have declined since 1918. So it's changed and it's a fact that we have to deal with.

And the other, in my point of view, my concern is is this going to -- it doesn't get much press here, but I think the scientific community says this is the largest environmental problem that we face. Talk about MTBE in the water, this is one that you have to address. Concern for my children and my children's children. Biomass can contribute to the impact.

Just for some historical perspective, nothing's new. 1907 report, use of alcohol and gasoline in farm engines, can we use it? Yes, we can. No questions, really.

Actually they had a project that pre-dates Ray Katzen, a biomass ethanol facility in

1911. Sawdust to ethanol. Up in Washington State. Using a -- hydrochloric acid, strong acid hydrolysis process. So in 1911 they produced biomass methanol. They talked about government problems, competition from molasses. Plant only operated about two years, but it was up and operating. It's now a restaurant.

Hazel Curtis' father, the photographer, was an owner of this facility. But, this was before your time, Ray. But, you know, we've been dealing with this, we being the industry.

Some comments or overviews on the biomass. I'm concerned about this 50 million tons of biomass out there in California. There have been about 50 million tons since the 1980s -- those reports are about the same.

You have a big physical resource, how much can you actually get into a market. And there are serious constraints all along the way. You can only take so much material off a field. Environmental -- how much can you recover. The recovery systems. How much is it going to cost. And even if you can get it all into a market -- so just saying there's biomass, 50 million tons, is great. But you have to get how much can be used, and how much is going to be available. The constraints that are really there.

You guys have done a great job in the time you've had available, you know. You started this a couple months ago, and this is -- I know you realize where you have to get to, where the actual projects have to get to. But it's very important to get there.

This is a report from a paper last year, a few years ago. Looking at biomass resources in the State of Washington for ethanol production. And I looked at the top of the bar is the amount generated. That's your 50 million tons.

And the blue line is how much would be available with constraints in Washington State for ethanol production. Forest residue significantly less because of the cost of getting residues out of the forest. Extremely expensive to get Forestry to -- depends on the slope, depends on the piece size, depends on the distance from the road. A lot of factors go into that.

But for Washington State this was the amount generated from forest residues, this is the amount possibly we could recover economically.

Mill residues, sawmill residues. Fair

amount generated. They're all going to markets. You have an outfit like pulp and paper industry takes the good chips, the slab chips. The fuel that might be left is bark. Doesn't make a good ethanol.

Municipal solid waste, paper. From Washington State we collect mixed waste paper as a separate entity. It's a good feedstock. We've done some preliminary work actually with EMREL doing some analysis for us. It seemed to, just from laboratory type analysis, looked like a good feedstock. Mixed waste paper. If it's collected already, got a good value.

And the ag field residues, economic constraints on how much can be pulled off of a field. Ag residues can vary seasonally, depends on what the climate's doing, what the weather's doing.

California does a lot of irrigated agriculture, so their yields are pretty flat. In Washington State, they will vary depending on what the rains do in the dormant season.

The feedstocks are critical and the final one on feedstocks, on supply curves, were in facilities -- how much can you provide at what cost. These are two different counties in the Northwest. One in Chelan County, is not much material there. In Douglas County, which is over in Oregon, $20 a dry ton, up to 5000 cubic feet.

These type of curves, supply curves, as you need more material your costs go up. And it can vary dramatically from location to location. So co-location is good, but where is your material, where are you going to get it?

Personally, co-location, I like mills rather than power plants, because mills also have a big wastewater treatment system in place that has to be dealt with in ethanol production. A power plant doesn't have wastewater treatment facility in place.

On the technology side, this is a slide from EPRI, applies to this industry, also. Capital cost learning curves. We do our first cut estimates and say it's going to cost this amount. As we get closer to building it, the price goes up. As we build the first plant, we increase the price. And it's the third or fourth plant before you can start really learning.

EPRI, when they did their analysis, put in a process contingency and a project contingency. And process contingencies at the stage we're at now would be 30 percent contingency on the capital cost. We haven't built a commercial plant.

So there's a lot of risk, and I think it should be recognized. I am an advocate of ethanol, and a long return of big environmental benefits it can provide, but there's a reality that has to be addressed and realized. And Pat said some of the intentions aren't recognized in this. That the first plants are more expensive. It's going to be a learning curve, and it's going to be costly.

I'm not sure this is in the same order on your sheet, but I'll -- capital costs. On the draft report, the economic analysis, and it depends on the timeframe we're looking at obviously. Capital costs, to me, appeared low, 20 million co-located plant project in 2003 at 52 million for capital costs. The Jennings plant, according to -- website, a 20-million-gallon plant is $90 million in 1999.

This figure, I'm not sure if it's included in that, but there are some -- cost considerations. And remember, the Jennings Plant is an existing ethanol plant. A lot of facilities in place, even more than are co-located. So capital costs, cost of production are critical.

Most important, secure product markets and feedstock supplies. If there's not a market you're not going to get financing to build it. And probably without a secure supply of feedstocks.

I think one of my slides got pushed aside on focus on feedstocks, which I mentioned. The supply curves. And another consideration is the Midwest, again, they have corn -- in the Midwest. That's biomass. They can convert that into ethanol. What that competitively is going to do to markets here, you know. The consumers of this material are probably going to be the petroleum plants. They're going to buy the lowest cost material they can, that's the way they operate. A business.

In the Midwest biomass can provide, they're going to buy it for less.

What's the future? I don't really know. The --, they don't know, either. You know, what's probable? Forecasters try and tell you what's probable. What's possible. Some sort of scientific basis, you can't go beyond thermodynamic -- things like that. And what's preferred is the domain of vision. And the Commission, I think, has had vision, and has vision. And I support the notion of decide where you want to go and make it happen, following your vision.

Forecasts, you know, forecasters sometimes aren't right. 1980 they forecasted the price of crude oil, Department of Energy, 14 different scenarios, you know, high economics, low economics, spaghetti chart, right. The price didn't go anywhere.

So, it's sort of a worthless exercise. But 1980 this is what the forecasters told us -- because that's what the future forecasters are going to say.

I took this data, they said, you know, what happened, so this is from the previous one updated to 1996, high scenario, low scenario, actual scenario. Forecasters missed it big.

But I think we are up to $22 today crude oil prices. Of course, it costs 50 cents a barrel to pump it out of the ground. Forecasting is difficult. Be skeptical.

On technologies, science tells you what you can do, but we operate from a bias of where we're at at that time. It's called situational bias. The head of IBM said there's a market for five computers, that's the head of IBM. And he said that because they were dealing with vacuum tubes. You know, 20 years later RCA, other companies said there's a very limited market for smaller computers because they're doing individual transistors, they're not integrated circuits.

So science said, you know, that forecasting and science says, science says because they're dealing with what they have right now. It's a situational bias. And it's very difficult to get out of that, but I challenge everybody to step back and challenge every assumption that you have.

What do we have? We'll go back to what do we want to have. Don't violate laws of thermodynamics.

Some comments on should California government take an active role in fostering the biomass industry. Comments. I think California need a biomass policy to insure some interagency, you know, every agency has its own directives, set down in statute, that sometimes conflict with another agency's directive.

It might be nice if there was a policy dealing with biomass. And maybe -- and how they can be best utilized, you know. It's going to take something from higher up to try to force some cooperation. President Clinton has this biomass initiative to try to enforce cooperation from the Department of Agriculture and the Department of Energy. You have to address it at a high level. I think that would be helpful.

Tax incentives, federal tax incentive is supporting the ethanol industry right now. I don't think that's debatable. But there are benefits. I mean depending on the analysis you look at there are benefits, at least on the corn-based systems, of reduced subsidies -- not subsidies on corn anymore, but the agricultural community economic benefits. And depending what report you believe, could be net positive benefits of the subsidy. The actual dollar amount going into the excise tax exemption is far less than the benefits -- it's a redistribution of wealth. Governments do that, when they collect taxes, they redistribute the wealth by policy.

They hopefully have a mission. If they want something better to happen, and are willing to redistribute basic resources.

Provide a back-up ethanol market for California biomass ethanol producers. MTBE, you know, what's going to happen? Are they going to allow -- then what happens to your ethanol market. There are E85 vehicles. The state could do some requirements to get a base or floor to run that market. So there are things to get some base, to cover some risk.

Again, my concern about the global climate change, biomass -- to reduce greenhouse gas emissions. The 3.5 billion gallons total ethanol production in California; scorched earth policy type procedure. California uses what, 13 billion gallons a year of fuel, so ethanol is not going to solve the transportation problem.

The study we had done, you have to have more efficiency in the vehicles. You can't depend on just the fuel replacement taking care of greenhouse. You need fuel efficiencies have to go along.

Paper production not construction. California's put a lot of money in projects --

build it and we'll pay you, and it doesn't have to operate, we don't care. That's, I don't think, good policy. Not going to buy production.

It would be well worthwhile for California to get involved in this federal biomass initiative, get some federal dollars. People sitting at the table are going to have the say on where those dollars go. You should get a seat at the table.

And educate the public. Let the public know the benefits of biomass. There are a lot of benefits. Pat mentioned the forest health issue, a very good issue. Rice grown locally here. Solid waste, an opportunity. I mean you can bury it in the ground, but -- at least in Washington State, the public is willing to sort of separate, take care of their garbage now. Partly because they increased the rate. If you don't, you got to pay for it.

And, again, Washington State said, we can mandate a government collection, we can't mandate use. But the markets did follow. This is a chicken-and-egg. Well, we'll build it if you would provide feedstocks. So the state said, we'll get a feedstock available.

It went into recycling, a good bit of it. And then the market determined where it actually went. End use.

And that's basically the conclusion. You have decisions to make. We have technologies that are improved, all over the board. Economics tells you what we should be doing. Going to have to compete in the market.

And politics tells us what we will do. Politics not in a bad sense, but politics as public policy, public benefits, recognizing that redistribution of cross-benefits. You know, I'm an advocate of taxing the bad and rewarding the good. Don't tax income because you want people to make money. You've heard the scenarios. They haven't been implemented, but they make good sense in my simple economic mind. Reward the good and you tax the bad.

So that's an overview of a lot of different things from 22 years; Ray has many more years than I do in this industry. -- markets and resources, and political will will make this thing happen if you want to.

So, that's -- those are my comments.

MR. PEREZ: Thank you very much,

Dr. Kerstetter, for your perspective on this very important issue.

With that, we're going to move into the public comment session of today's workshop. Before we move into that, I'd like to just ask, has everybody that is here today filled this out, in terms of who's here, with your address and phone number, so we can contact and share with you future reports and information regarding the development of this project.

So, okay, I see somebody in back. Send this back with another person back here. Just have you return it at lunchtime. Appreciate that.

Also, what I'd like to do is take comments from those of you who cannot be here this afternoon first. Can I see a show of hands again? Okay, so I think we'll start with these four here. and what I would like you to do, since we're trying to create a public record here, is to come up here, or you may remain at your seat and use the microphone. But turn it on and identify yourself, as well as your affiliation, for all of us, too, so that we can get that into the public record.

Would you prefer having them up here?

Okay, I'm going to have you come up to the mike, then, so we can it into the record.

I had a question back here? Oh, not yet, okay. One other thing, I'm on call right now, and I'm going to be pulled out of this meeting here in a few minutes. And I'll briefly have to leave for about 15 minutes. And I'll come back in.

And in my absence I'm going to have Dr. Val Tiangco lead this session. So, I'm on call right now, and I'm just waiting. I'll have to go out and I'll be back, so I hope I'm not disruptive in departing, but I will be back as soon as they call me.

So, with that, please come forward.

MR. KRAUSE: I'm very sorry I have to leave, I have to get back on the floor. My name is Art Krause, I represent the Williams Companies, part of which is pecan manufacturing and ethanol.

I only have one brief comment regarding a table within your document. It's table A-1 which talks about U.S. ethanol usage and blending values.

There's a note at the bottom of the table that discusses Minnesota. It says, in effect, Minnesota has a year-round oxygenating mandate stipulating 2.7 minimum oxygen content in all gasoline sold in the state.

According to industry sources the language in this regulation includes use of MTBE, and as such, the mandate amounts to an ethanol mandate.

Williams has a problem with this particular paragraph in that the 2.7 percent weight can be met by any oxygenate. And the regulation says they, and we understand them, do not include the use of MTBE. However, the choice of an oxygenate is ethanol.

That basically is the statement that I would like to present, and I want to thank you for inviting us here. And, again, I wish to apologize. I would love to say here and learn more about it from the experts.

And I want to thank Bill Blackburn; he's been a great, great assistance to us. Thank you.

MR. PEREZ: Thank you very much for that input, sir. Next, please.

DR. KATZEN: I'm Raphael Katzen, Professional Engineer. I have a doctorate degree in chemical engineering. I want to make one correction in the earlier slide, I'm retired from Raphael Katzen Associates International -- Katzen International, and was a consultant of EC International, -- California projects.

I'd like to share a little background. I will claim -- seniority here on ethanol and biomass.

I've been working with biomass since my first job in 1937, making chemicals from sawdust and forest waste in Wisconsin. Involved with the pulp industry all this time, and with ethanol from grain, molasses, and the last 20 years, biomass.

Falcon Engineering, during World War II, built the defense plant corporation in Springfield, Oregon, ethanol from sawdust plant. I was designer, assistant project manager, project manager, and we also managed the operation of the plant.

We made 300 tons of sawdust a day, 15,000 gallons of ethanol with difficulty. So that was later than the plants that Jim mentioned, but the first really large scale plant. It was uneconomic in peace time. It was shut down.

Since that time at Falcon I have designed nine major ethanol plants, fermentation from molasses and grain, and synthetic methylene.

The Katzen Group has designed over 50 plants worldwide for ethanol production from a variety of materials; again, molasses, grains and in recent years, the development of biomass methanol.

I wanted to comment to some of you who may recognize me, I was here at this Commission with some people seven years ago. I and Ron Miller of Beacon Energy were the only ethanol proponents. There were about ten methanol proponents. So we were out-weighed, out-ganged, and frankly, we didn't create much excitement about ethanol.

But I do want to compliment the group here on this report. It is a magnificent piece of work. It's a breath of fresh air, and I think it's the start of a whirlwind in California. I think it can be built on very successfully.

And I'd like to add a few other comments. Some are in my written remarks which you'll all have.

Energy value is often misunderstood and misrepresented. And it was in this report where the energy value of ethanol as a fuel, its Btu value was just a discounted factor against gasoline. That's improper. The combustion of ethanol does not depend on its fuel value only, but on its octane value, which is 113.

The octane value compensates substantially energy-wise for the reduction in fuel value, the improved combustion.

Now since 1978 when the Katzen organization did a basic study with the Department of Energy on motor fuel alcohol from grain, and as Jim mentioned, pointed the path to a reduction of energy use, production to one-third of what it was in previous decades, and is even lower today.

We've seen this argument about ethanol being an inferior fuel. In Brazil, which I started visiting in 1960, and the inception of their ethanol program until the OPEC prices in 1974, they started with a 22 percent blend. And they're currently talking about going to 24 percent.

And then about 12 years ago I was in Brazil when they announced they had a treaty. They called it a treaty, if I could read Portuguese, do better in Spanish, for the automobile companies, American, German, Japanese, all building in Brazil, to produce neat ethanol fuel engines.

Now, here we hear from the -- it is very difficult, very complicated, very expensive. They did it overnight there, under edict. And it cost only $200 to $300 per car to burn ethanol, which is really 90 to 95 cent ethanol and 5 to 10 percent water. Actually a little more, there's a benefit.

There are four million of these cars going in Brazil. Brazil, as I point out, is consuming not just 3.5 billion gallons of ethanol a year, as neat fuel and as blend, there's over 4 billion, over 16 million liters.

When you visit Brazil, the biggest city in the world next to Mexico City, or equal to it, is San Paulo, 20 million population. Fifteen, 20 years ago you could hardly breathe the air in San Paulo from the fumes, motor fumes. The gasoline was already, to begin with, federal gas as a government monopoly, and so produce -- fuel.

Five years ago I was in Brazil visiting a manufacturing plant on the outskirts of San Paulo. They sent their ethanol cars for me every day, different kinds, knew I was interested --

straight ethanol cars. Run beautifully, no problems at all.

Regarding the outskirts of the city, got out of the car to look at the skyline. A magnificent skyline. Brought my camera out to take pictures and it struck me, 15 years ago I couldn't have taken those pictures. You couldn't see the buildings for the smog. So there's a real demonstration of air pollution abatement.

Here in the States, despite the arguments, there's a lot of statistics available. Studies started in 1980 on the effectiveness of ethanol blends in reducing carbon monoxide and hydrocarbon emissions, on the order of 20 to 25 percent. There's a lot of data available; I think their group can look into it through the Department of Energy, the Alternative Fuels Association. There's other groups, CFBC, that are accumulating this data.

We're going to lay that to rest, that is really a major benefit in the reduction of air pollution, in addition to the greenhouse effect improvements.

Now, let me talk a moment about subsidies, since it's what you people are looking toward. It's in your report. You discuss it, and it should be discussed.

I don't know why it's a dirty word. Every new industry in this country for 150 years has been subsidized. The farm industry would be dead if it wasn't for subsidies. And now they've been cut back, there's more relief, there are problems with the poor harvest, weather conditions.

In 1976 the Department of Energy had Betel and Juarez do a study on subsidies for energy of all types. I don't know if -- I think you've seen it. It's two volumes, like yea thick, published by the Department of Energy. You ought to get it. It shows subsidies for nuclear, for hydro, for natural gas, for petroleum. And which gets the biggest subsidy? Petroleum.

In 1976 it was $70 billion given as subsidies; 140 million today. Take inflation and add in two years of the Persian Gulf control of 30 billion a year, and the $100 billion Gulf War to protect petroleum supplies.

Various studies have shown that if all of these things are factored in, and there were no such subsidies, petroleum today would be not $20 or $22 a barrel, but anywhere from $60 to $120 a barrel.

We have cheap gasoline here because it's been so highly subsidized. And I'm willing to debate anybody in the petroleum industry on the question of subsidies.

The big mistake, I feel, was made twofold. One, tax as a tax remission, excise tax. It should have been direct Department of Agriculture subsidy. And it should still be.

Secondly, why we had to stop at 10 percent ethanol I'll never know. We saw 22 percent in Brazil, 15 percent in Cuba right after World War II when they had a surplus of molasses. I participated in that program.

At 20 percent ethanol you eliminate the pressure factor. There's an anomaly in the blends, and 10 percent raises it one pound; and 20 percent there's no difference.

So, anybody's interested, I brought along a program I outlined in a presentation to Congress at the Capitol Building about three years ago when renewable energy -- 20 percent ethanol and gasoline, 20 million gallons by the year 2020. Must be proactive, not reactive.

Supports, you addressed this very well in the report. Not just subsidies, but as Mr. Perez pointed out, difficult financing world, you're dependent upon the financial people who have ice water in their veins. Enthusiasm and rejections -- they want hard facts. The only hard fact that will get them to invest in these new plants are things like loan guarantees, which venture capital and then move in and support; subsidies, in terms of feedstocks, if they can't be transported economically, you have to clear your forests to minimize these forest fires that hit so badly year after year. Besides the billion dollars in firefighting costs, you've probably lost half a billion dollars in wood reserves in California.

And I worked with the pulp incentives, as far as it's worth, the pulp. And also, as some states have done, like Minnesota, direct subsidies that produce for ethanol production. I think these subsidies are needed to get the industry started and going, but as was pointed out by Mr. Perez, things will improve with time, they always do. Nothing is permanent. I'm still here because I'm still improving things, helping to improve things. That's what keeps me going.

And eventually these phase out, but the thing won't get going in California unless you face the facts that the government, the Legislature faces the fact this industry is needed and will benefit your economy, the farm economy, the fuel economy, generally, and improve your ambient conditions, your forest preserve conditions, and the rest.

Thank you very much.

DR. TIANGCO: Thank you, Ray. And when I first met you three years ago I remember what you said, biomass-to-ethanol has always been a bridesmaid, never been a bride. Hopefully what we're doing here may help biomass to -- a bride.

Phil is the next one.

MR. REESE: Good morning, and thank you, Val. My name is Phil Reese, and I'm speaking today principally for the existing biomass-to-energy industry here in California. There is a trade association of which virtually all of the plants and plant owners are members. It's called the California Biomass Energy Alliance.

My plant, which is the newest and largest in the state is a very active member in that.

You're here, I'm here to state the support of the existing biomass industry for the objectives of this project, the development of a biomass-to-ethanol industry.

I think the relationship between the current biomass-to-energy industry are excellent, and in fact it's largely due to the administration of the SB-90 transition funds by this agency that we still have a biomass-to-energy industry. That was meant as a great and sincere compliment.

(Laughter.)

MR. REESE: Some of you may know, so I will be very brief, today in California there are 35 operable biomass plants. Only 30 of them are operating, some of those at reduced capacity. We are consuming about 6-million tons a year of biomass, turning it into electricity.

Relate that 6 million to the 50 million potentially available that Pat had in his presentation. At the peak of the industry between '92 and '94 there were 44 biomass plants operating in this state, consuming a little over 8 million tons a year of biomass.

So in the last four years or so we've

lost 30 percent of the industry, very largely due to the deregulation of the electric business. Really, they've simply deregulated the generation of electricity, and the principal criterion is low price. Low price wins.

And I think many of you know that the current biomass-to-energy plants cannot produce energy at a competitive price with respect to natural gas.

Now, the biomass-to-energy industry in California is so new that many of us who started it are still around, and remember the difficulties we went through. My company was responsible for permitting 17 biomass plants here in California. And I'm speaking biomass-to-energy plants. Under the PURPA and Standard Offer 4 arrangements that were available.

Of those 17 only 13 actually made it through construction and went into operation. So I'm speaking from personal experience. And I want to address our comments to what you quoted from the Governor's directive, which was to develop a biomass-to-ethanol industry. He didn't say develop a laboratory scale experiment or a little pilot plant, it says an industry.

That's quite a difference than developing or supporting one small scale demonstration project, and I think you all know that. But I want to emphasize that because there's some big differences.

The biggest difference I see is the financing. Now, you mentioned difficulty of obtaining capital. That's what I do for a business. When you're trying to finance an industry that does not have a track record, with a new technology, it borders on the impossible.

Now, I already told you that we've lost 30 percent of the biomass industry to date. I will tell you that it is very likely that by the end of another two years you won't have 30 plants operating, you'll have about five.

And at that time the fuel supply infrastructure will have collapsed. Today our industry supports about 900 employees at the plants, and about 1200, plus or minus, in the fuel supply infrastructure.

The fuel supply infrastructure is identical to the fuel supply infrastructure that a biomass-to-ethanol industry will need.

Because of the availability of those

Standard Offer contracts, which today are viewed as lucrative, but when we signed them they were unanimously universally agreed to be a win/win deal for everybody because of the projections that were shown that the oil price was going to go considerably higher.

But the availability of those contracts allowed us to create the fuel supply infrastructure. My plant has about 30 fuel suppliers, ten of them are sizable. And I will tell you that every single one of them created his business by financing his grinder, his truck and renting his lot on the basis of a contract which we could afford to give him, and which was required by the financing entities.

The existing biomass industry would not exist today if we had not been able to assure a consistent and adequate long-range fuel supply by funding long-range contracts with the fuel suppliers.

And I'm telling you that it's the lack of a biomass policy today in the face of a deregulated electric generation business that is leading to the demise of the existing industry.

And you should be very concerned that if this fuel supply infrastructure collapses, and we have 30 or 35 steel-and-concrete mausoleums around the state, it's going to border on the impossible to obtain financing for another biomass industry to build more steel-and-concrete facilities.

Hence, your comments about co-location are very very appropriate. But if there's nobody to co-locate with, it's going to be tough.

I will tell you, since I'm the environmental permitting here for my plant, we could put a biomass-to-ethanol plant on our site with, I believe, literally no permitting difficulty.

Another aspect of the similarity, after the fuel supply infrastructure, is that if I understand the processes correctly, there is a significant amount of residue from the methanol production process, which must be disposed of.

It appears to me that that could be burned in an existing power plant to create energy. So we're creating electric energy, we're creating energy in the form of ethanol. The business is the same. You collect the biomass; you turn it into energy in one form or another; and you have something to get rid of.

Now, the list of environmental benefits that have been displayed on these slides. Everything from air quality improvement, elimination of burning, forest health, landfill benefits, are exactly the same as for the existing biomass industry.

It's going to be tough to sell those benefits to anybody if those benefits are not sufficient to continue to support the existing industry.

I think Dr. Kerstetter talked about public benefits and subsidies. Those environmental benefits could be viewed as public good. And I think that I can prove to you that the individual citizens do not pay and will not pay for public good. The proof is the almost nonexistent growth of the green energy sales in California. The only company that can sell any green energy or renewable resource is Green Mountain Energy, and they're selling it at a discount using the subsidy that you guys are providing to allow them to do that.

Individual citizens will not pay for public good. It has to be a government policy. And as was mentioned a couple minutes ago, a redistribution of the money. I prefer to view it as the government perceives a public good and forces everyone to pay their fair share. But that's not happening because we don't have a policy.

Subsidies won't create an industry. I can tell you that from experience.

I want to lastly touch on a couple of topics that actually came up this morning. One was the potential for energy crops. The existing biomass industry has examined that ad nauseam.

My plant, which is located down in the far southern end of California, spent a great deal of time trying to figure out if we could grow our fuel more cheaply than collecting it. We even looked at growing the trees in Mexico where the labor and the land is far cheaper. Not even close.

We're certainly willing to work with you on that, give you anything we've done. But in essence it's cheaper to use waste generated by somebody else, than to pay for generating your own waste.

Now, greenhouse gas calculations. We have been working with the White House Staff on climate change for some time. And have extensive detailed calculations tied to the Kyoto Accords, the White House policies, and have quantified the contribution of the existing California and the exiting United States biomass-to-energy industry toward reducing the production of greenhouse gases, or to state another way, contributing to the Kyoto Accord objectives. We'll make those available to you, be happy to share them with you.

What I'm trying to say is that there needs to be a connection between the existing industry and the yet-to-be-developed biomass-to-ethanol industry. And to the extent that we all stay in business, we'd like to work with you doing that.

Now, I've asked -- well, Dave Allen, who is the Director for the California Biomass Energy Alliance, is going to tie some of my loose ends together. Thanks.

MR. PEREZ: Thank you very much, Mr. Reese.

MR. ALLEN: Thank you for allowing us this opportunity to come before you and issue forth our thoughts today. My name is Dave Allen. I'm the Director of the California Biomass Energy

Alliance, which as Phil said, is the industry owner and operator organization in California that is responsible for these operating biomass-to-electricity power plants.

Dr. Kerstetter mentioned it, I'm going to hit on it a couple times here briefly, the State of California doesn't need a biomass-to-ethanol policy. It doesn't need a biomass-to-electricity policy. The State of California needs a biomass policy.

Whether you believe that there are 51 million bone dry tons of waste generated a year, annually here in California, or whether, as some of the even reasonable estimates have run to, over 100 million tons per year, it doesn't matter. It's a big number.

And those biomass wastes are currently, and have been for years, being disposed of in wasteful, uneconomic and sometimes harmful ways. That's why we need a biomass policy. We need a biomass policy that addresses energy in all its forms, and other bio products, but mostly to address the disposition of these wastes in a better way.

The biomass policy would establish the

utilization of biomass wastes for useful purposes will always take precedence over nonproductive disposal. And useful purposes include much more than energy. It includes, as I've said, biochemicals, organic chemicals, fertilizers, building materials, soil conditioners and other beneficial uses, some of which we haven't thought of yet. There's plenty of biomass waste available for all these purposes and more.

I think it's important for the Commission and for the state, as we go forward in this effort to examine the development of an ethanol industry, to make a clear distinction between the development of an industry and the successful long-term viable operation of that industry.

I've been a biomass power project developer for about ten years, and after that I was involved in developing biomass fuel supply infrastructure, and in operating of the plants. So in my industry I've seen all facets from the beginning to the middle to where we are now.

And the approaches and the objectives are often quite different. In fact, the people are often quite different. The people that were involved in the early development of this industry, 15 to 17 years ago, are largely, not entirely, but largely not around today. They're off doing other things.

There are other people who are responsible for making these operations viable, long term and stable.

If the state is interested in short-term development it can provide support in the forms of project financing, feedstock subsidies and other short-term and often short-sighted approaches to development.

But if it's interested in establishing a stable industry that serves public policy, it will give support to the creation of markets. This doesn't mean that the state shouldn't support feedstock infrastructure development, but the support should be in the form of policies which favor utilization over disposal of biomass waste.

While the California biomass power industry welcomes the development of a biomass-to-ethanol industry in the state, we believe it's critical that state government not implement policies that would advantage one segment over the other by subsidizing feedstock collection for ethanol, as an example.

Our two industries are essentially the same. We're the same because we're based on the disposition on the disposition of biomass wastes. Our products are slightly different. They're both energy products. One is electricity, one is fuel alcohol.

If both technologies are to survive, though, the state policy must value the respective peace talks identically. If you provide, for instance, a direct subsidy without any other policy attached for a feedstock for alcohol or a feedstock for electricity, you're automatically going to disadvantage the other industry, because we will be competing for feedstocks, which, while they are abundant, are expensive to collect and process and transport and handle.

If your support for these industries is structured such that the feedstock always retains the same value for both end uses, that disadvantage to one or the other industries goes away.

The biomass unites us, our end products cannot divide us. There are powerful reasons to work together. And the biomass electricity industry stands ready to work together. We've held some preliminary discussions with the developers of biomass ethanol. It looks like there are lots of things we have in common. We hope that there will be nothing that we have that divides us.

Thank you.

MR. PEREZ: Thank you, Mr. Allen. Next speaker, please.

MR. PREVOST: Thank you. My name is John Prevost. I'm with -- Director of Environmental Services with Pacific Lumber up in Scotia.

And I don't want to repeat any of the things that were said by Dave or Phil, I'd like to talk a little bit more plant specific to just try to give you some of the things that we would think about in a project such as this.

And I will mention about three years ago we did deal with ENREL and had some preliminary discussions with ENREL and Department of Energy about the potential of an ethanol plant. And I'll tell you the reason why we didn't really go through with that.

We generate about 500,000 tons of fuel a year in our process. And one of the things that we do with that fuel, about half of that fuel is used to supply our in-house load. We have a contract of low dollar, Standard Offer 1 contract with PG&E that we've had since 1988, to sell up to 20 megawatts of power.

So our main concern is to feed ourselves internally, both steam and electric load, and then sell the remainder of the power to PG&E. And it's been about half and half. We've sold about 10 megawatts on average to PG&E. But in the last two or three years that's gone down significantly.

The cost for us to purchase power to run our facility in Scotia would be just prohibitive, cost prohibitive to us in lieu of generating our own power. So, like I said, one of the things that we look at in the fuel is feeding ourselves.

Over the last five or six years we've had a tremendous decrease in the quality of our fuel. And that's been for a number of reasons. Increased technology in the mills, pressure to get more and more product out of a given piece of timber.

A lot of the stuff at the time we talked with ENREL, they wanted to look at chips, you know, they didn't really want to deal with biomass fuel, per se, the stuff that you guys are talking about here. They were more interested in the chips.

Well, we have chips that go into the paper process. And so when we're talking about moving product from one type of waste from one source to another, we have to look at what we're leaving, okay. And if we've got a paper source, that's a pretty good source of income.

There's a lot of work being done with things like end-glue, edge-glue. We can lay-up a board up to two inches thick and four feet wide and 20 feet long, and then re-saw it with pieces of wood 12 inches long. And the board that we saw is stronger than a board cut out of a solid piece of wood. And you see a lot of that, finger-joint type stuff in the stores today. We do an awful lot of that, mostly, but we don't do the two-inch stuff, we do the one-inch. But we can go higher.

We have a power plant in Scotia. We have three boilers, two turbines. And we can burn up to 1500 tons a day, which is a lot of fuel. And to put that in a perspective with something that you can deal with when you're talking about moving fuel, that's about 60 truckloads. About 25, 26 tons of a load in fuel.

We also have a compost facility at one of our sites. We haven't done full composting. We do more, put a little bit of green waste into it, and we put out more of a soil amendment.

We have a clean closure plan that allows us to go in and do clean closure on an old woodwaste landfill that's got some wood in it that's some of it probably 30 years old. We might try to use that in our compost facility, and then take the wood that comes out of it, take the fines and use that in compost, and then burn the fuel, aug it up and burn it.

We do a lot of log deck cleanup, things that we didn't do before. It's hard to get rocks out of the fuel. You know, we do a pretty good job of burning the fuel. We have a heck of a time burning the rocks. So that's something that we'd have to deal with.

Another thing that when you talk about the fuel, what needs to get pointed out is the different types of fuel that are available in the different parts of the state, like Phil talked about. His plant runs almost totally on urban woodwaste. We've got plants that run almost totally on ag waste, prunings and stuff like that.

In our case, we're probably 95 percent mill waste. And I notice one of the big sources of fuel that you got there, or potential for the ethanol process is in-forest stuff. And even in-forest stuff has to be dealt with almost on a case-by-case, site-by-site basis because of the ability to get in there and economically get that slash trimmings off the timber that's been cut. And get it out to a landing where you can economically grind it up and load it into a chip truck. You can't haul fuel out on people's backs or in dump trucks.

And in our area where it's extremely hilly, it's very very expensive to get that stuff out. So, you know, you may look at subsidies and stuff like that. Those subsidies may not even touch it in certain locations.

So, in one point, there may be sites up around Quincy where it's, you know, a lot of the stuff is flat and you can get in there and you can do a lot of things that you can't do in all locations. So that's something that really needs to be thought about.

We're interested in looking at alternatives for the amount of stuff that we have available, the amount of waste that we do have available. It was interesting to see that the process has progressed to the point where they are looking at the ability to bring in what we consider fuel, waste fuel, that's not going into chips or into paper or some other more valuable process, particle board or something like that.

So, anyway, all I've tried to do is tell you there are some differences. You can't take one brush and just say biomass. You got to look at different areas in different parts of the state.

We spent a significant amount of time here in the last two years. Phil talked a little bit about what's going on at the federal level. And we've been trying to get -- we spent about a million dollars trying to expand the thing they have called the closed loop biomass tax credit.

And closed loop biomass is something that he touched on when he talked about growing your own fuel. That's where you burn fuel that's been grown specifically to burn for energy. And it's been in place since 1992, and it's been a real money-saver for the government because nobody's ever done it.

(Laughter.)

MR. PREVOST: So, what we've got is a tax credit that's never been touched. And we took the plants -- we had a good base of plants, biomass plants in California. We expanded that into a coalition throughout the United States, and have almost universal commitment from all the biomass producers in the country.

And we worked to get that closed loop biomass extended. And did a real fair job of it. We got it through the whole budget process until it went to the -- we had good strong support from both sides of the fence, and we got it through the budget and it went to the budget committee. Three members from the Senate and the Congress. And Congressman Archer from Texas personally torpedoed the thing, and got it thrown out. And as you may know, Congressman Archer is very much supportive of oil.

And this whole biomass thing was not part of the deal. And it got thrown at that budget thing. We had hopes of trying to get it back in to do it, and what this would do would expand this tax credit for all biomass plants. And take that closed loop portion of it out. And try to continue with things that Phil mentioned in the viability of these plants in the future to be available to do energy and stuff like that.

The co-location with an ethanol facility and a biomass plant is a very good mix. And a lot of us have the room to do that, being able to supply a constant load of fuel into it is iffy. That's the tough part. And dealing with the waste is another part.

So, anyway, I'd like to thank you for the time. By the way, we didn't get any support, nobody really jumped up and tried to back Congressman Archer down on that, after the fact. We didn't get hardly any support out of California in our ability to do that. We're hoping to restore that and come back after they get back in session, and hopefully we can get it put back in.

So, thank you for your time. And I do appreciate you listening.

MR. PEREZ: Thank you. Next speaker. The gentleman back here, and then we'll take you next.

MR. HINMAN: My name is Norm Hinman.

I'm Manager of Business Development for BC International, a company that's utilizing new technologies to manufacture ethanol from biomass waste. And we're currently completing financing to construct a 20-million-gallon-a-year facility in Jennings, Louisiana. That will be using the gas which is the residue from the sugar mills as feedstock.

We've signed a letter of intent with the City of Gridley here in California to develop a second facility that will be using rice straw and woodwaste as its feedstock. And in addition, BCI is executing plans to develop a facility in Chester, California, which will be using woodwaste to produce ethanol.

I'm here today to present some policy recommendations that we've developed in response to the questions raised in the notice for this workshop. We believe there are two types of policies that will best help secure financing required to develop a suitable sustainable California biomass-to-ethanol industry.

And these policies are policies that guarantee a ten-year market for biomass-to-ethanol in California. And, two, policies that make low interest loans available for biomass-to-ethanol projects.

I'll discuss each of these policies in greater detail momentarily.

First, I'd like to thank the Commission and this Committee in particular for the tremendous job you've done in preparing the report. In the draft report the Commission did a superb job of highlighting the widespread public and environmental benefits of biomass-to-ethanol, noting its ability to reduce greenhouse gas emissions, to provide for a sustainable domestic fuel supply for California, and to help solve California's solid waste disposal problems.

Development of a biomass-to-ethanol industry could also provide a boost for California's bioenergy industry, as we've just heard, which is struggling to compete in the deregulated electricity marketplace.

Biomass-to-ethanol projects located in the same sites as existing biomass energy plants can increase the efficiencies of both these plants.

I might also add that the development of a biomass-to-ethanol industry in California would extend the state's fuel supply providing a buffer against the possibility of future price hikes.

I'd like to use my remaining time to respond specifically to questions 1 and 4. In the written documents that I gave Mr. Perez, we have our response to the other questions.

As you all know, development of a biomass-to-ethanol industry is emerging as a national issue with potentially great rewards for California.

Most recently in recognition of the environmental and economic benefits of the biomass industry President Clinton issued an Executive Order to establish a national goal of tripling the use of bioenergy and bioproducts by the year 2010.

For ethanol this goal translates into an increase of approximately 3.5 billion gallons per year. Meeting the President's goal would add $15 to $20 billion in new income for rural areas.

As detailed in the draft Commission report, abundant biomass resources and a potentially large local market for ethanol provide California with the opportunity to establish itself as a leader in the biomass-to-ethanol industry. And a major contributor to the achievement of President Clinton's goal.

Right now we at BCI have two projects in development stages in California. With state support for a guaranteed ten-year market for the biomass-to-ethanol, and low-cost loans, we believe that these projects will provide the foundation for a thriving competitive biomass-to-ethanol industry in California.

While the nation's existing ethanol industry is largely supported by federal policy, many states provide additional incentives to stimulate local ethanol production and use. These states benefit from the economic development and the net increase in tax revenue derived from their local ethanol industries.

California should look to establish similar policies that both encourage local markets for ethanol and also support the development of a biomass-to-ethanol industry within the state. Such policies would benefit everyone along the supply chain from the farmer or fire prevention department through biomass-to-ethanol producer and fuel retailer, all the way to the citizens who would be able to breathe cleaner air and have an improved energy security.

Ultimately all Californians would gain from the biomass-to-ethanol industry's contribution to rural economic growth and to environmental solutions associated with waste disposal, wildfire, and air pollution.

In the immediate future, California's priority should be to get a few commercial biomass-to-ethanol plants up and running. The success of these first plants will be to open doors for additional plant financing, increased economies of scale, and market development.

Mid- to long-term policy measures should continue to streamline the financing process and create markets for ethanol. Policies that recognize and promote the public environmental and economic benefits of biomass-to-ethanol, especially relative to the often hidden negative external costs associated with imported petroleum-based alternatives, should be strongly encouraged.

Let me elaborate on some of the policy ideas that will help us to meet the short-term and long-term goals.

We support implementation of policies that would insure a market for biomass-to-ethanol projects over the financing period, or for ten years from operational start date of the plant, and thereby attract private investment capital.

Some ways to accomplish this goal include California might buy an insurance policy to insure the market; California might insure a market by acting as a broker, for example by purchasing and reselling ethanol outside of California if the in-state demand was insufficient; California could require state-owned vehicles to use ethanol or gasoline containing ethanol; and finally, California could establish a renewable fuel standard that would require all gasoline suppliers to include a minimum percentage of ethanol or some other renewable fuel in their total annual fuel sales.

We also support the issuance of low interest loans. For example, a 3 percent 15-year loan from the state would assure a timely closing on financing of initial biomass projects in California. This type of loan would encourage developers to site biomass-to-ethanol facilities in California, as well as to secure additional financing from private institutions.

If biomass-to-ethanol plants prove successful, as seems likely, the cost to taxpayers would be zero. Low interest loans could possibly be made available through the California pollution control finance authority.

The intent of these policies would be to support a thriving competitive biomass-to-ethanol industry in California. Anticipated technological advances associated with a mature biomass-to-ethanol industry will result ultimately in significantly reduced production costs that will increase the price competitiveness of biomass-to-ethanol relative to petroleum-based fuels.

The proposed initial support will help create a successful industry that can contribute to California's economy, tax base and environment. And ultimately needs little or no state support.

Thank you for holding this hearing, providing me with the opportunity to speak. And on behalf of BCI, we look forward to continuing to work with the Commission. Thanks very much.

MR. PEREZ: Thank you, Mr. Hinman. This gentleman next.

MR. CHILCOTE: I'm John Chilcote; I'm a Director with Placer County Resource Conservation District, and also on the American River Watershed Institute Board.

My qualifications, I guess you'd say I'm an expert in the vehicle code after 30 years of enforcing it on the freeways. To quote something from the May conference up at Squaw Creek, I'm from outside the box. And I find it very easy to think outside the box. And since that time, looking at things, saying where can I help on this overall goal.

One particular item that I was involved in a feasibility study sponsored by the Sierra Economic Development District regarding a biomass facility feasibility study in Foresthill. And it fell flat.

One of the problems that we saw in there was the big factor in everything, the labor cost. Every time something has to be handled the cost goes up more.

Looking at it, because we're sitting right there, the gateway to the Tahoe National Forest, the national forest people are trying to reduce over-growth, and there's a big problem. Because the equipment to carry it out of the forest can only operate on the highway, cannot get off-road. The stuff that can handle the stuff off-road cannot be operated on the highway.

That's a constraint.

To go back, when I hear somebody talk about a constraint I have to sound like some of the free thinkers in San Francisco, challenge authority. Why is that constraint there? You know, examine the constraint. Can it be modified?

This is the synopsis I did of the California Vehicle Code. Went through and pulled it off and put it down in a Word format. These are all of the sections in the California Vehicle Code referencing implements of husbandry.

And I know from years of enforcing it that was the biggest laugh in the vehicle code. Everybody has to comply with the vehicle code except the farmers. Because the lawmakers way back, since the recodification of the vehicle code even, have always applied special benefits to the farmers.

Used to be cotton trailers going down the road in Bakersfield for miles, not one penny of registration, not one brake, nothing. The only requirement was red light on the rear trailer during the hours of darkness. And the farm tractor towing it didn't even have to be registered.

So why do we have to have $45,000 or greater semitrailers hauling chips down to processing sites? That because everybody looks at it as waste. That's not waste. That's a silvacultural byproduct. Just like the farmers are doing something out there.

We need to have that looked at more, to come up with more of these regulations to allow that. To where you've got a vehicle that's got a soft enough footprint that it can go out on the forest floor, collecting the biomass in whatever method, in chips or in stacks, being able to be brought out to the highway. And then towed down the highway, short distances just like the implements of husbandry, there's a limited distance, but to sorting yards, to where the stuff can be processed.

You don't have to pay tremendous fees for those simple trailers to go down. That's just one of the items from outside the box to try to reduce the price of getting the feedstocks in.

The constraints challenging, yes. I have been involved quite a bit in the last three and a half years since retiring, with forestry and all the other elements. I'm very much involved with the California Fire Safety Council.

They had a big workshop down in Irvine last year. And they were really concerned about fire reduction and all. And I participated in a couple of the workshops there. One of the ones there was a mention to the site about, oh, yeah, biomass can help us get rid of all that fuel load out there that burns up in the hills. But it didn't go any further from there.

Maybe because "no is my job" comes into play. Well, Forestry doesn't have anything like that, so that's not their job. That's you guys' job. But was there any conveyance of it? No.

Those of you that were there notice, I thought, there was a big absence of CDF personnel at the conference in May. They're not concerned.

Most recently, and I have to apologize to BCI representatives, at the July meeting of the State Fire Safe Council, right here next door, BCI sent a representative down to address the statewide council about what they were trying to do. And I feel that he got the hell kicked out of him. I thought it was very very embarrassing to me to sit there and watch this go on. That's the attitude that CDF has on it.

So here you go to the other point that if it's the Governor's policy this should come down to all agencies, to get together and hold hands and forget their damn turf wars. Because that's what this is.

You got to get Nichols to tell her bosses, get together and talk and work this out in a common factor.

Thank you.

MR. PEREZ: Thank you very much. Okay, I believe we have somebody else out in back that has to leave before this afternoon.

MR. SHAFFER: Good morning, I'm Steve Shaffer with the Department of Food and Agriculture, so this isn't quite public comment, but public agency comment, I guess.

And thank you for the opportunity and for accommodating me. I have to run off to some CalFed meetings, another area with little controversy involved.

And I'll touch on that a little bit in terms of also thinking outside the box, and perhaps provide a little more challenge in that regard.

First of all, I want to thank the staff

and management for including me in the process of putting the report together. It's nice to know that some of the old work I did in the early '80s maybe wasn't all for naught, and is still a little bit useful, as this was put together.

Also, just to mention that CDFA has had a long interest in seeing a biofuels industry develop. Because of the potential rural economic development opportunities, the economic opportunities for agriculture and further diversification of an already diverse industry. And I think more recently in terms of strategies to address environmental issues that the industry is facing.

Therefore, in that context, CDFA wholeheartedly supports the two preliminary recommendations that were made in the executive summary. As far as the 10 percent diversion that was referenced in the waste management strategy, and then also especially in terms of developing a well integrated multiagency effort, which is sorely needed in developing a state policy.

Not only for biofuels management, but as the gentleman just referenced, in terms of overall resource management. And that includes land, air and water, as well as energy.

A couple of specific comments. And I'll continue to work with staff to refine the document, but I want to highlight a couple.

First of all, I think the report still does need to include at least a short reference that there are other market opportunities for fuel ethanol besides the gasoline blend, and besides E-85. And that would include the E-22 blend that Ray has mentioned.

I've been putting that out there since the AB-234 committee met in the late '80s. Also now oxydiesel, other heavy duty applications, E-95 and E-100. And I think those at least need to be out there to help raise consciousness, if you will.

I noticed, and I came in late so I didn't hear the staff presentation, but we've gone back and forth in terms of how to address manure as another biomass resource. And I think it should be included in table 3.1.

I've talked with ENREL and gotten a commitment that if I get them some samples they'll run some analysis. And that shouldn't be too much of a problem. I just got to find the time.

Also we have submitted a couple samples to our feed laboratory at CDFA and should get some preliminary results, and we do have some preliminary results that I think show that it is a potential resource for biomass ethanol.

In terms of thinking outside the box, I know the Governor's Executive Order talks about a waste-based industry, but I think we need to think of these resources as under-utilized resources, and not as waste. And perhaps if we can be consistent in getting that message out, that will help change some of the conventional ways of thinking about these things.

Just for a point of clarification and again this is minor, but I think important, the rice straw utilization tax credit isn't exactly properly referenced. And I'll work with staff. It's a CDFA run program, not ARB. And I think it should be highlighted that it's a utilization tax credit. It does not go to the grower or producer of the rice straw. And it's capped at $400,000 per year through 2008.

I want to talk just a little bit about energy crops. And there's still a little bit of work that needs to be done on table 4-1, and I'm willing to help in that regard.

But, also in terms of energy crop production, off in the future we do need to have a 20-, 30-, 50-year time horizon, I believe, not just five or ten year. There's a lot of agronomic opportunity in developing energy crops. And those who work in agriculture know that you do not develop a crop overnight.

The agronomic development, even with biotechnology, takes five, ten, often more years than that, to develop it to an economic potential.

Also, again in terms of thinking outside the box, since working in the CalFed Bay Delta Program for the last three years, they're looking at a massive ecosystem restoration program. And in the context of that program they're looking at potentially reallocating up to 200,000 acres of agricultural land for environmental restoration and habitat development.

And I'd like to put out there the notion of conjunctive use, not only of water, but of land. And that there are opportunities to expand the conservation reserve program in USDA so that habitat is developed, but then it is managed for economic benefit, as well. And that there can be the harvest of biomass for energy purposes, or industrial purposes. That can coexist with habitat. And so I'd like to put that notion out there and see that developed in terms of an interagency policy development framework.

Also just touching on irrigation water that was mentioned in chapter 4, as well. There are opportunities to use reclaimed water, and I think those will continue to grow in the future. And that reclaimed water perhaps will not be accepted as drinking water, accepted as high enough quality for irrigation of food crops, but is already now used for golf courses. So certainly it could be used for irrigating energy crops.

Also, using crops and plantations that treat water, and those might be cattails, which there's been a little bit of work done that showed them to be a potential energy crop, as well. But other systems, again that have multiple benefits, continue to seek the nexus of environmental benefit along with under-utilized resource management.

I touched on also environmental impacts and I think the report mentions that energy crop production and agriculture systems certainly do have potential for environmental impact. But I think they have potential not only to reduce environmental impacts but to actually provide a benefit to the environment.

In terms of, as I mentioned, these conjunctive use strategies of plantings that have both habitat benefit water treatment, water quality benefit, as well as carbon sequestration benefits, as well as the potential for providing a biomass resource for energy purposes.

CDFA remains committed to be a part of this process, and we look forward to the continuing development of the issue. Thank you.

MR. PEREZ: Thank you, Mr. Shaffer. And before you leave, I know that Mark Yancey was here earlier today. There he is. I know he's eagerly awaiting a box of manure to take back to Colorado.

(Laughter.)

MR. PEREZ: If you can arrange that during the noon hour, really --

MR. SHAFFER: I'll go get my shovel.

MR. PEREZ: All right, next speaker, please.

DR. KATZEN: I have a couple of

comments --

MR. PEREZ: Comments, okay.

DR. KATZEN: -- preceding speakers. The speakers on biomass energy electricity a very good point. Ethanol should be and must be integrated with power production.

My first assignment work with John Hinman for the Gridley project was to go to the power plant and study their operations. I'm familiar with power plants, boilers, it's part of my chemical engineering background. Integration is quite feasible.

For example, you people know what University of California at Davis, it does excellent work in gassification of rice straw, as a fuel.

I'd like to address the gentleman who did a very good presentation on getting at this problem of woodwaste. I say the reason I'm so active all these years, I'm learning something every day.

Fourteen years ago I learned a lot in a week at a bioenergy, bioethanol conference in Sweden. Sweden, as you may or may not know, has no petroleum, no natural gas, very little, if any, coal. They got lots of forests, have a big pulp and paper industry.

What I was amazed to learn at this conference what Sweden has done to develop techniques for harvesting, collecting waste in the forest and bringing it in in useful form. Special equipment they developed for working in the forest. Classification, chips go to the pulp industry. That was with power plants. Others go to domestic fuel. Special trucks and moveable bins they've done.

I think it would behoove this Commission to send a delegation to Sweden and learn something about forest waste processing. They are decades ahead of us.

Other places, too, but that's the one I would recommend. Thank you.

MR. PEREZ: Need to raise that to our management. We can have ask them -- love to go there.

(Laughter.)

MR. PEREZ: Thank you. Additional comments, particularly from those people that have to leave and cannot join us for the afternoon session. Anybody else like to comment on the draft report, or would like to -- we could begin the discussion on some of the comments we've heard this morning. Or we could break now for lunch and come back at 1:00. What would be your preference out there?

AUDIENCE SPEAKER: Is it possible -- I don't know how many other presentations there are -- is it possible just to go through and finish the whole thing?

MR. PEREZ: That's an option, too, yes. Is there anybody out there that would like to respond to any of the presenters' statements, comments, or has additional comments on the staff report?

We have a couple, okay, let me get some reaction. Sir.

MR. MILLER: I'm Rus Miller with Arkenol. I've made some extensive comments which are out there for everybody to read. I'd welcome feedback if anybody has any.

I'd like to make sure that the message gets across that any critical remarks that I've addressed about the report are kept in context. That this is an excellent report. It addresses the correct issues, I think. And I think the arguments that all of us have are basically the details of potential future implementation of a policy.

I'd like to I guess back up what Norm Hinman just said about a couple of the key things that industry needs to make this happen. I've been in the alternative energy business, both biomass and solar, thermal side, so I've got some scars on my backside from those experiences.

The first thing is you have to make a market and it has to be a reliable market. And it has to have a long enough term, obviously a long enough term to insure that financing parties can recoup their investment. And that means 10 to 15 years. Ten years is probably the minimum; 15 is better.

The second thing is if the state has a policy that they wish to implement, then they need to provide an appropriate support. Now, those can be subsidies of a large varieties. I was pleased to see that there was even a consideration of making a direct investment. That's not typical of American politics, more typical of European politics, like in Sweden.

What Arkenol would see as a very helpful tool for it to get its project in Sacramento over the last financing hurdle would be the 3 percent loan from the state directly. That has two advantages. The interest rate is obvious to everybody sitting here.

Something that's not obvious is that when you do project finance the banks typically require that the first money that they loan you go into an escrow account to pay their loan back. So that raises your financing costs, and then there are all the underwriting fees which are quite substantial. So a state loan could obviate most of those expenses.

I'd like to point out that California is justifiably world famous for implementing new technologies. The Energy Commission particularly has a lot of successes on these walls right here, both economic and technical.

In fact, yesterday in another venue I was talking to a guy who now builds wind power plants around the world, and he has no subsidies from anybody, just avoided energy costs. And he's making a profit.

So that's a recommendation to you to not be fearful and to encourage the Commission to not be fearful to take an action and take the lead and have a full measure approach.

I'd like to reiterate that your comments about the Integrated Waste Management Board needs to be involved in this process. And they need to review their Act to allow diversion of materials to be unequivocally accounted so municipalities are not dis-incentivized from talking to people like us.

A detail that I was told by Tom MacDonald to confirm is what's the capacity of the Arkenol project in Sacramento. It originally started out as 12 million gallons a year of ethanol. Due to the fact that ethanol pricing is pretty much in the tank right now, and the uncertainties in the ethanol market have existed for some time, we began to consider what else we could do with the sugar that is converted from the cellulose.

You can do a lot of organic acids. And I've forgotten who had mentioned that there are other chemicals you can make, but there's a wide variety.

This Commission report should not overly focus on these other chemicals, but should be aware that some of them are quite substantial.

Arkenol is converting two-thirds of its sugar volume to the production of citric acid. Citric acid is a commodity chemical, pretty high value. Published reports are 70 cents a pound range. That's three times to four times what alcohol pricing is per pound.

So that's why Arkenol's volume of ethanol has reduced from 12 to 4 million gallons. It's merely the economic drivers, which you are appropriately focusing on.

And then finally I'd like to maybe encourage you to consider using a conversion rate above 70 gallons per ton, or at least elaborate on why you choose that number. It's useful to point out that Rick Hanson just told you in 1957 they had 50 gallons per ton capacity. We've had a little technical improvement since then.

And also, wood is only 50 percent cellulose, and the rest is lignin and dirt. If you're using something like rice straw, it's 75 percent cellulose. If you use something like paper, it's 95 percent cellulose. So I would encourage you to elaborate on that.

Again, you have produced a very valuable report. And I think it will be improved by your further consideration. And I am welcome to any questions you might have.

MR. PEREZ: Thank you, Rus. Okay.

MR. BOYD: For the record I'm Jim Boyd, I'm Energy Adviser to the Secretary for Resources, and I really came here today just to listen and learn on this subject, but I feel a moral obligation, I guess, as a public servant, to address a couple of concerns, particularly the gentleman who is addressing the issue from outside of the box, relative to interagency coordination and cooperation.

I can't speak for the past too well, but I want to assure those in the audience that I'm going to take advantage of the fact that there are people concerned about this subject in the audience, that not only the Resources Agency, but several of the agencies represented in this room, are quite concerned about this issue.

We have had interagency meetings on the subject of biomass. I have had multiple discussions with the Director of CDF. We have had at least two meetings of our little interagency group that have involved representatives of CDF.

We've had individual meetings and collective meetings with Department of Food and Agriculture, the Air Resources Board, and we have on our agenda to include in these discussions, the water board and integrated waste management board.

So, just let me say that while carrying on this subject, the whole subject of biomass and dealing with biomass in the broadest possible definition, is a very high priority, not only of the Resources Agency, but of CDFA, as an agency, and of CalEPA, and we are definitely working together on this issue.

And to some of us there's a new window of opportunity to deal with this question. And those of you who know me, know I've been around government a long time, and have flirted with this biomass-to-energy or biomass-to-something else multiple times.

But I do think there's a unique opportunity now, and this is but one of the issues. And I just want the taxpaying public to know that we're trying to address this, some of these concerns.

Thanks.

MR. PEREZ: Thank you very much for

those comments, Mr. Boyd.

Sir.

MR. KOEHLER: Just to follow up on that, I think it is very encouraging to see that so many government agencies are represented in the audience here today.

My name is Neil Koehler, and I am President of Parallel Products. And have the dubious distinction of being California's only surviving ethanol producer currently today. Hopefully we'll see a lot more of that in the future.

And I think the effort here is a big step in that direction. This is an excellent report with a lot of great detail, facts, considerations, policy, discussions, and I just think it's -- I can't congratulate you enough on a very, you know, very good report, and a very good vehicle for trying to move the discussion forward and hopefully in a fairly interagency way, an expedited way. And that also includes the California Legislature developing a set of policies in the state that will start implementing the kind of ideas that are in this report.

I want to start by I have here the

Strategic Plans for the California Energy Commission. I think just reading the mission statement and the vision statement kind of, you know, directly addresses what you're all doing here. And it shows that, you know, this is the kind of effort that we need to endeavor.

Mission statement is it's California Energy Commission's mission to assess, advocate and act through public/private partnerships to improve energy systems that promote a strong economy and a health environment.

And the vision statement, It is the vision of the California Energy Commission for Californians to have energy choices that are affordable, reliable, diverse, safe and environmentally acceptable.

I think ethanol is certainly an example of something that is very true to both that mission and vision. And I think if you look at our current transportation energy sector, we have a system that is quite incompatible with that mission and that vision. There's nothing diverse about our liquid fuel supply. It's wholly dependent upon increasingly imported and insecure sources of petroleum as a sole source.

There is nothing clean about gasoline. In fact, there's nothing clean about carbon-based fuels, even ethanol and others have incomplete combustion. So conservation and vehicles that use less is something that's very critical.

But certainly moving in the direction of cleaner burning and renewable fuels like ethanol provides cleaner fuels and certainly more diverse fuels. And I think that fuel diversity that's always been a goal of the California Energy Commission is more important today than it's ever been. And we seem to forget about that importance in light of low crude oil prices that we've experienced. I thought Jim Kerstetter's chart was very interesting in all of that.

We seem to be headed in the other direction, at least short term, but in California we've experienced a very unreliable supply of gasoline of late. We've gotten some indication of what happens when you have one or two refineries go down, and the price of gasoline virtually doubles overnight.

So I really think that we have a very precarious fuel transportation system that needs to be addressed. And promoting the production and marketing of ethanol in California is one very positive way of doing that.

I want to share just a few lessons that I draw as California's only surviving ethanol producer, and some of these lessons hopefully can be helpful in both individually for companies that are choosing to try to build plants here, and state policy makers, as we try to build a new vibrant ethanol industry.

It's really been a hostile economic and regulatory environment in California that has stifled ethanol production and marketing in this state. You know, certainly the low crude oil prices have been extremely difficult.

When we first started out in the early '80s, oil was at $30 a barrel; supposedly going to 80. When we started out we were selling ethanol at $1.60 to $1.70 a gallon. And, you know, virtually overnight we were the last -- a couple years after that, we all know what happened. Crude oil went to 10, ethanol went to $1 and below. And, you know, very very difficult environment for, you know, anybody to build a new industry, and specifically to build a new plant to produce ethanol.

On the regulatory side, certainly we feel there have been arbitrary regulatory barriers, and you know, kind of a lack of real coherent policy to promote alternatives to gasoline. And we're certainly, I think, starting to address those. But that's something that has very definitely stifled the use of ethanol in California.

At one time there was as much as 70 million gallons of ethanol used in the State of California. That then in '95 went to zero. And now there's a small amount of ethanol that's being used in a pilot program that TOSCO Corporation has ongoing to show that ethanol can be used in cleaner burning gasoline.

The lack of coherent policy to promote renewable fuels and alternatives to gasoline. That's been a significant problem. I really agree with the speakers that talked about a need for, you know, not knowing just a biomass policy in the State of California, but a renewables policy. We should promote renewable electricity, renewable fuels all as one system.

And when you do a lot of legislative work and coalition buildings and policy making, there's a real artificial separation between electricity and fuels. And we should integrate that, because what we really do need is a renewable policy for the State of California. And that should really incorporate the synergies and the strengths of both the electrical side and the fuel side to work together.

On the fuel side there's been this notion of fuel neutrality. That, you know, we don't choose fuels. Well, I'd like to just challenge that notion. I think what fuel neutrality is, is just another word today for the status quo. The status quo is an overwhelming reliance on one nonrenewable, polluting fuel source, crude oil.

And so fuel neutrality really has just been a way to say the status quo is fine, and you know, let those market conditions, crude oil prices and refinery choices, dictate our energy future.

And, you know, nothing against the refining industry. They're certainly our customers and we work closely with them today and will in the future, but it's, you know, they're not in the business of supporting alternatives to their fuel, so I think there is a need for a coherent policy to say that no, we're not just fuel neutral, we're not going to just accept the status quo. We recognize the need for an energy policy that just as the mission and vision statements say, you know, integrates things, offers choices, fuel diversity renewables.

And then on a more microlevel for our company, you know, there have been four ethanol plants in California; most recently there have been three that were operating, two others in addition to ourselves. They both don't operate because of the lack of the market, and the very adverse economic conditions on fuel ethanol, because that's all they were selling.

Our own survival, and I think whether it's Rus talking about citric acid, there is a need to look at, you know, diversity in your own system.

The only reason I stand here today as an operating ethanol plant is not because of our ability to sell fuel ethanol, which we do sell, at quite a cost, because we've had to export it out of the state to all the states around California that use ethanol.

But we have sold at least half of our production goes to nonfuel, industrial ethanol applications where we get significantly more per gallon and have developed some very good relationships over the years and have some very stable niche markets for that.

So that's been one key to our survival. And the other has been that, you know, and I think this is a lesson in the feedstocks and establishing the contracts in the, you know, essentially the waste minimization services that we provide, is that as our economics on our products have eroded, you know, we essentially have established a very valuable position vis-a-vis our customer base, which is the food and beverage industry in California, where we are helping them minimize waste costs.

And so as our product cost has deteriorated, we essentially have had to go and increase our service revenue. And that's been justified on the basis that landfill costs have gone up and sewer costs have gone up and that's essentially what we compete with.

So, it's really a combination of nonfuel ethanol sales and our service revenue, which has provided us the economic diversity and strength to survive what has been a very adverse economic situation on the fuel side.

So I think to the extent that you can integrate biomass plants into these power plants; to the extent that you can produce other products than just fuel grade ethanol, that that's a very critical component in building a healthy business.

I'd like to move to, you know, how can we capitalize on this unique opportunity. I think sort of establish that, you know, ethanol is a renewable fuel, and provides some fuel diversity, and the economic development opportunities. Does provide some unique opportunities to the state. And, you know, how do we move in that direction.

It's been said a number of times already today, and I can't underline the importance: We must have a stable, secure and growing long-term California market for fuel grade ethanol. It's the only way to finance plants. It's the only way to be competitive against plants in other parts of the country where we then, by selling it into the local market, have the transportation advantage which is significant, both in terms of cost and reliability of supply.

And we have the largest gasoline market here in the world, a huge market opportunity for ethanol. There's all sorts of ways of encouraging the use of ethanol in California's clean burning gasoline program. And it's critical.

The only, you know, sort of near- to mid-term secure market for ethanol that has to occur is in blends in gasoline. While there are opportunities with the 85, certainly, you know, mid- to longer term opportunities in both neat alcohol and fuel cells, the only market that will really provide the security right now to build and finance these plants is in the gasoline market in California.

And given the octane and the clean burning opportunities that ethanol provides, it's also a very good reason to make sure that we're encouraging the use of ethanol in California.

Specifically the alcohol fuels policy I think is very good. In light of the MTBE issue I think it could be certainly inserted in there that the unique opportunity of substituting ethanol for MTBE in the current program really provides a tremendous short-term opportunity to get ethanol in the market today.

Specific government incentives and requirements are the only way to really accomplish this introduction of ethanol into the fuel market. You know, many say, well, you know, it's just it's a price problem, and if you had a low enough cost of product you could get in there.

I have a chart, I didn't have time to turn it into a transparency, but I'll show it around and you guys can make copies or whatever, but this essentially is a chart that tracks, since a little before the Governor's Executive Order, the wholesale price of gasoline, which is the red line. The price of MTBE, the blue line. And the delivered price of ethanol to California net its tax incentives. So this is the cost to the refiner.

And as you can see -- put it out here, too --

(Off-the-record discussion.)

MR. KOEHLER: It's a red line, it's pretty easy to see, the basic just here. The most volatile price has been the price of gasoline. Also overall the highest priced.

The price of MTBE, which actually has gone up since the Governor said let's get rid of

MTBE, which -- I'm sure everyone's taking that seriously but the Governor -- and the green line is the price of ethanol. Very stable. Very cheap. Is there more ethanol being used today in California than there was when the Executive Order was authored? No.

So it's not a cost issue because ethanol certainly, for the winter months when there are no air quality restrictions and we're dealing with that, as well, but there is no reason why ethanol shouldn't be used to replace MTBE this winter. It's not happening. And it's not because the price of ethanol isn't attractive. It's significantly more attractive than both the price of MTBE and the price of gasoline.

So that's just one --

AUDIENCE SPEAKER: Is that available on the website --

MR. KOEHLER: We can probably get it there somewhere. I just, you know, used -- it's all publicly available information through oil price information and service on the MTBE and the gasoline. And that's just, because I sell ethanol in California so I know the price there.

But yeah, I think it's -- because, you

know, we get a lot of comments thrown at us that, you know, ethanol's too expensive and this and that. And I think that's just a pretty clear indication that that's not the case. Yet we're not seeing any movement.

Again, you don't blame the oil industry for wanting to turn their products into the gasoline that we use. That's why we need to have some coherent government policy that moves the issue along.

And instead what we have is, you know, the only tangible public policy today for encouraging the use of ethanol in gasoline is the Federal Clean Air Act has an oxygen content requirement. That, because of the MTB situation and MTBE, currently having the majority of that market, that whole issue is under debate.

And while there may be better alternatives to the oxygen standard, what we essentially have the State of California doing is advocating the elimination of it without specifically proposing something to replace it, to provide incentives for the use of ethanol in a very secure and long-term fashion.

So, you know, while we may have

disagreements on what the future of the Clean Air Act should be, I think the one thing we should agree on is that if there is going to be any advocacy for removing the oxygen requirement, we at the same time are advocating on very specific policies that would encourage the inclusion of renewable ethanol in California's clean burning gasoline program.

The specific way to do that, in my mind, would be, and it was mentioned by certainly Norm and I think others possibly, as well, is a renewable portfolio standard in the State of California. That is a very, I think, from the public policy standpoint, certainly given the economics of ethanol, the opportunities to produce here in the state, it makes complete sense.

And it's something that can integrate with electrical side, too. And there's been a lot of talk on the electrical side about renewable portfolio standards. If we had some requirement that both the fuel system and the electrical system include a component of renewable, that would do more to build this industry in the state than any single policy direction.

And it's something that the state can

do, as a state policy. It's something that could eventually become a national policy. But it's something that, you know, that we would be very interested in working with the Energy Commission, the electrical folks, a broad coalition of environmentalists, others. I think there's a high degree of interest in the California Legislature. That, you know, if the Energy Commission could sponsor that kind of initiative and work on, you know, as soon as the next session in the California Legislature, to adopt a policy like that. That we could do everything that's required to provide a kind of long-term market security that I think you've heard a number of people talk about.

The producer payments, either as direct payments or tax credits, also should be considered and make a lot of sense. There was in your report mention of the need to compete with other states that have such programs. That to be on a level playing field with them, it may very well be appropriate.

The State of -- you know, the largest increase in ethanol production has come in the States of Nebraska and the States of Minnesota, that provide direct, you know, in the case of Minnesota they provide an oxygen requirement year-round, as well as a 20-cent producer payment. The State of Nebraska also provides a 20-cent producer payment.

So, you know, we compete with that out here in California. While we do have a 10- to 15-cent freight advantage, you know, it's pretty incredible sometimes what the price of ethanol delivered to California is that we have to compete with, and it becomes very difficult for us without something that competes with that payment. It makes it difficult to market here in California.

I think with that, you know, there's no question if you combine some sort of producer incentives with a renewable standard that you will encourage the capital required to build these plants, and we will be able to build a vibrant industry in this state.

I think it's clear that the raw material is out there. There's a motivation on the part of those that control the under-utilized resources to work with the project developers, to go into the long-term contract supplies on feedstock, which is also critically important. Combine that with the long-term security on the market, and I think we can crack the nut.

Low interest loans are also a very good idea. In fact, we're living testament to low interest loans. The Parallel Products began with a 3 percent low interest loan from the Department of Food and Agriculture. So we are living testament to the fact that low interest loans can, you know, can result in a private enterprise that, you know, now, other than the federal incentive that, you know, we enjoy, we have no other direct government involvement in our business.

I would caution against the government picking winners or losers by becoming too involved with any one specific project. I think while it is important to make sure that those projects that, you know, appear to be near term commercially viable, that they get all the support they can.

But I guess I would just caution to, you know, I don't think it's appropriate for the government to necessarily take equity positions in any of these facilities. I truly believe that with, you know, there's so much that we can do on the broad-based public policy.

If we have these renewable standards and we have, you know, some loan incentives or guarantees, or low interest that's available to anybody that comes with a viable project, obviously that has to be judged. But I think that that will provide the incentives, and then the government doesn't have to get too associated with one specific project. It's more here are the tools to be used, and let's see who can flourish in this environment.

I'd say the second main area where I feel that we can take a big step forward in the State of California is to have an integrated air quality policy that fully recognizes, incorporates all of the benefits of ethanol.

And I think that in the past that certainly has been missing. I think that was part of the arbitrary regulatory environment I was referring to in the past, where I think that, you know, through oxygen caps and other restrictions on the use of ethanol, that we got knocked out of this market.

And while the benefits of the higher levels of oxygen in terms of carbon monoxide and hydrocarbons and high emitters and off-cycle and all things I don't need to go into, but that we are engaging certainly the Air Resources Board on, that if we were to fully incorporate all of that into the air quality regulations, we would have a much fairer environment under which ethanol could compete well in the clean burning gasoline program.

And we are making progress. And we're having meetings all the time. And, you know, like to certainly put in a word of support for the staff at the Air Resources Board, who I think are trying to deal with these difficult issues in a very short period of time under the Governor's Executive Order to try to really look at, in an open and fair objective manner, where there has been a lack of really including some of those benefits.

And we've made progress. I would say there's a lot more progress to be made. Hopefully we can make it by the end of the year.

But I do think that by looking at all of this and really applying a systems analysis to air quality regulations, we will come up with an air quality program in the state that has the potential to be very encouraging to the use of ethanol. And that's critical.

In that regard, and I don't know, you know, how it gets worked into the short term program of coming up with a new predictive model and new California regulations, but in the context of global climate change and a systems analysis is absolutely critical that CO_2 becomes part of our air quality regulatory program.

And while that is not the easiest endeavor to define and come up with, I would agree with Jim Kerstetter that climate change is the largest looming environmental issue, largest looming air quality issue. When we have a hot summer, and our ozone levels go through the roof, it was because of the hot summer.

When we have like this summer incredibly low ozone levels, it's because of the temperatures. The air quality regulations, the clean burning fuel, that's all a part of it, but the temperature has more to do with our ozone levels in California than anything else. And to the extent that the temperatures are rising, so is ozone.

To the extent that conservation and renewable fuels are the only way to solve our climate change problem, they've got to be incorporated in the air quality modeling.

Ethanol obviously blended into ethanol provides a very significant CO_2 reduction, 50 -- I think it was in the report here, 57 percent of CO_2 in California comes from mobile sources, transportation sector, largest fraction of any state in the United States, not surprisingly.

So, what we do on a fuels basis, it's critical on CO_2. So I can't underline that fact enough, that we've got to figure out how to incorporate CO_2 into our air quality regulations and modeling.

My last challenge would be to the oil industry. They're certainly our customers. We have worked with all of them. And there becomes a disconnect. I also have the dubious distinction of not only being the guy that sells ethanol to oil companies, but then goes up against them in more of an adversarial situation often in the Legislature and dealing with the policy issues.

And I think we, you know, our industries need to work together, you know, certainly it could be said that, you know, we need to recognize that the customer that, you know, that oil companies are valued customers. And we do, we wouldn't sell our ethanol without it.

On the other hand, my challenge to the oil industry is to recognize that we, as an ethanol industry, and hopefully this vibrant growing ethanol production industry in the State of California, is a valued supplier. And we certainly get that feeling with the people we work with in the oil companies that buy the ethanol. They certainly feel that way.

But I think at the higher levels of the oil industry the ethanol industry is still recognized as a competitor. And competing for space in the gasoline tank for that which they would rather produce from crude oil.

Again, totally defensible, don't blame them. That's an economic decision. It's a lot more profitable to crack crude oil into gasoline and sell that to the consuming public than it is to buy ethanol and replace some of that material that you would make from crude oil.

So, it's a situation that I totally understand, but as we move forward and as a community of human beings trying to solve these very vexing environmental and economic problems, that is my challenge to the oil industry is, you know, how do we work together, how do we get the oil industry to really, you know, embrace this growing ethanol industry in California as a, you know, as a valuable contribution to the California economy, and a valuable source of supply to the gasoline infrastructure which clearly the oil industry will continue to dominate for years to come.

Thank you very much.

MR. PEREZ: Thank you very much, Mr. Koehler. And for the benefit of the audience, I just want you to know that the three presentations, including the slide by Mr. Koehler this morning, we will make available to you. And that's why it's very important that you sign the sign-up sheet. Hopefully -- I'm not sure where that is right now, but if you haven't put your name in there, please put it in there so that we can mail these documents to you.

Most of them we've already captured and made copies for you. And they're on the back table. But I do have three packages here, including Mr. Allen's presentation, Norm Hinman's presentation, and now the slide from Mr. Koehler.

Okay, I believe we have probably what, one or two more speakers, or people that want to comment. Mr. Hoekman, please come forward.

MR. HOEKMAN: Thank you, Pat. I'm Ken Hoekman from Chevron. I wasn't going to say anything, but Neil --

(Laughter.)

MR. HOEKMAN: Actually, I just have a couple of brief comments. I would like to congratulate CEC and the staff and consultants for the fine report that you put together. I think it's obvious you put a lot of work into this. You have assimilated a lot of information and put it together in an understandable fashion.

That being said, there are a couple of criticisms that I have. And incidentally, I did prepare some written answers and comments, which I believe Pat has at this point. And I'm really just going to re-emphasize a couple of those.

The main one is I think the executive summary is quite lacking in depth and substance. And as everybody knows, it's the executive summary that gets read. And the rest of the report is often ignored, despite your very hard and diligent work on preparing it.

In particular, the executive summary I think is far too sketchy. It does not include the details that a reader would need to know to understand how you arrive at your recommendations.

With regard to benefits, for instance, a number of benefits are cited, and they've been mentioned many times today. Many of those benefits are perhaps true, unarguable. But there is no firm justification for most of those benefits, nor are there cost benefits, associated cost advantages associated with those benefits, which I think would be very useful to include, if there's some way of doing cost effectiveness.

Two of the benefits I'd like to address. One of them is the greenhouse gas reduction benefit. It may well be true that there is a greenhouse gas benefit. I believe the wording in the report is that there's a potential for greenhouse gas reductions. And that's undeniable, there is a potential.

But I think to just say a potential is not very helpful to the reader or to policy makers. And there should be much more effort given to quantifying what greenhouse gas benefits might be present.

That's not an easy task, but the Energy Commission is quite skilled at doing these types of fuel cycle analyses or cradle-to-grave type analyses, which I think is necessary in order to put some defensible number on the table as to what truly might be the greenhouse gas reduction benefit.

Second benefit which is mentioned in one place in the report has to do with air quality. And I think it is also undeniable there's an air quality benefit, particularly if we're talking about the reduction of open field burning. Removing or reducing open field burning is clearly advantageous for air quality.

There was nothing stated in the report, and I congratulate you for this, nothing stated with regard to improvement in urban air quality. I would even be more strong in my statements to say there is no urban air quality improvement that can be attributed to the use of ethanol.

So, rather than ignore the subject, I would say address it and say what I believe the science says to be the case.

Finally, back to the economics, in the executive summary I think there should be some economic figures, charts, graphs, something shown in there of the type that are in the rest of the report. In addition, the essential assumptions and caveats and the reasons which you came up with those economic values should be included in the executive summary.

So, I'm not here to argue for or against a certain policy, for or against incentives, for or against any particular outcome of this, I'm just saying let's be up front and honest and put in the executive summary where people read, all the cost information, all the assumptions, all the essential information that a policy maker needs.

If it is going to require cost subsidies or tax breaks or whatever it might be, but say it. Let's put the numbers in there. That's my plea for you.

MR. PEREZ: Okay, thank you.

MR. HOEKMAN: Thank you.

MR. PEREZ: All right, next speaker. Sir.

MR. REESE: Bear with me part of a minute, I'll be brief.

You've heard today from us a request for a biomass policy instead of a biomass-to-ethanol.

And then you heard a request for a renewables policy which is much broader.

I'd like to caution you to think very carefully about the difference between a renewables policy and a biomass policy. There's a major difference.

As you may know, there are at least six federal bills, including one which will be introduced by the Administration, which contain a renewable portfolio standard in one fashion or another.

The biomass industry, and I'm talking the broad biomass industry, including the soon-to-develop ethanol part of it, can't compete under a renewables portfolio standard. If the renewable portfolio standard, RPS, is set initially at the existing level of renewable generation, sure, we'll have a place.

But, what is the cost of fuel for a solar project? Nothing. What is the cost of fuel for a wind project? Nothing. What is the cost of fuel for a geothermal project? Nothing. What is the cost of fuel for a small hydro? Nothing.

What is the cost of fuel for a biomass project? Substantial. See that picture up there, the fuel pile. That's the stuff that we have to collect, chip, truck and handle. The biomass industry, all of us, have a built-in disadvantage under a renewable portfolio standard, which is why we suggested a California biomass standard of some sort. Whether it's a waste-based or an energy-based or a broad.

Now, I will point out that we are prepared to give you a draft biomass policy. You can use it, you can throw it away, you can take parts of it, but we have a biomass -- we in the biomass energy industry have a biomass policy standard that is broader than our own industry, which we would like you to consider.

But, one last minor point. When John Prevost spoke of the production tax credit, which we've spent close to a million bucks, we in this case being the United States biomass-to-energy industry, have spent mostly on Washington lobbying firms, to get the expansion of the closed loop biomass production tax credit to include us guys who burn other people's waste, and Mr. Archer personally torpedoed it, the landfill gas credit stayed in, the wind credit stayed in, ours is out, but Senator Roth, who's the Chairman of the Senate

Finance Committee, has a little problem in his home area of Delaware, in that run-off from poultry litter is polluting the Chesapeake Bay.

So he created an equal tax credits, 1.7 cents a kilowatt hour right now, by the way, for the burning of poultry litter to make energy.

Now, I just gave you the complete definition of poultry litter in the law. Okay. Now, for a factual basis, poultry litter is generally poultry manure on wood chips. So, in an attempt to get a biomass tax credit for our guys, I've already put the chicken on the top of our woodpile --

(Laughter.)

MR. REESE: As far as I'm concerned I got 50,000 tons of poultry litter that qualifies.

MR. PEREZ: All right. Any other speakers? Okay, I guess we'll take one more. And what we're going to do is following this presentation we'll wrap up the session for today unless anybody has any additional testimony or comments they'd like to offer.

DR. KATZEN: I have one question of the gentleman who was speaking about the cooperation of different California agencies.

I'm from Ohio originally, and now Florida, a long way from California. I think I understand most of what's going on, but there is an organization called CARB, California Air Resources Board. I understand they concentrate on southwest California, maybe -- not sure, but I heard a talk by one of their key people just two years ago about all the problems of ethanol, most of which were imaginary.

When he got through, what I heard in effect was, maybe I was wrong, as far they're concerned no ethanol will be used, is that correct? This cooperation has to go a lot farther if we're going to clear up the thing in California.

With a billion and a half gallons of ethanol produced in the United States each year in the last few years, using mainly 10 percent blends, -- in the Midwest, of course, there is no problem. There's no driving problem, no motor problem, no maintenance problem. In fact, the automobiles are cleaner and better with the ethanol in them.

So, what we ought to get at this California Air Resources Board and see what really troubles them. Because they say you're out of synch with anything you've come up with in your report.

Thank you.

MR. PEREZ: Thank you.

MS. WITHERSPOON: I'm Catherine Witherspoon with the Air Resources Board. And, no, there's no prohibition on the use of ethanol in California by virtue of the air standards.

There have been concerns that the gasoline regulations make it more difficult for ethanol to compete, and we've been looking at making sure that we appropriately account for all the air quality attributes of ethanol in our models of gasoline when it has that as a blending constituent.

But there are 30 million gallons being used today per year in California gasoline, and we expect that market to increase in the future. And we're very interested in the CEC's ethanol report.

MR. PEREZ: Thank you, Ms. Witherspoon. All right. Our final speaker.

(Laughter.)

MR. FORREST: I know I'm fighting everybody's stomach here, to be the final speaker, so I apologize. I'll try and be very brief, Pat.

I first of all compliment the Energy Commission Staff, you did an excellent job on the report. It's a good framework. You've identified the major issues and you've done it in a very very short period of time.

And I'm sure any of us, as some of what you've heard, could critique some of the secondary assumptions, or the format, or the editing. I know you're going to go through two or three more versions of it before it gets out, so I won't dwell on any of that.

I would like to redundantly reinforce what you heard from the biomass-to-ethanol companies, all three of them.

Number one, you rightly identified in the report the major issues, financing, on any new technology, not just biomass-to-ethanol. And I think what you're hearing, an equation of the financing, the number one issue. If you don't get past that, forget about all the other secondary issues as a market.

And a ten-year market is not by per chance that the investment banks back in the late '70s, early '80s, required in this SO4 contract ten-year levelized costs. That was so they could recover much of their principal, if not all of it.

Same investment banks will be dealing with the creation of the biomass-to-ethanol industry. And they want to see something that gives them comfort in about a ten-year period.

And we work for the banks, as some of you know, doing some due diligence, and I've actually gone around and talked with some of the air quality regulators in the state, as well as some of the oil companies as if I was a due diligence member of an investment bank team.

And here's basically what I'm hearing: That there is likely to be a market for biomass-to-ethanol in California of some significance during the next five to seven years. Beyond that the crystal ball is a bit murky. You got alkaloids, you've got question of attainment on CO in the South Coast Basin.

And at the same time the only reason that all of us are even here today is there's a phase-out going on of MTBE.

So there's a period of time in terms of looking at the financing of the plant during that first ten-year period. It's probably between four and seven years, depending on the timing of the plant coming into operation, that is murky and will be murky to the investment banks.

And there's a number of alternative ways of assuring and providing comfort to the investment banks on attracting the capital on that market. And I would recommend and be happy to work with you or make some suggestions, some alternatives that would suffice, that I would suggest in your report you might try and identify some alternatives for doing that.

Second thing you heard is the need for low interest loans, and kick-starting the industry. And I want to compliment Dr. Kerstetter in terms of his presentation, and many of the charts he had in there either you and I have the same biases or the same framework.

But in there he showed a chart of how a capital investment figure starts in the concept stage and gets through the first, second, third and fourth plant, and you actually mentioned the 30 percent figure on the first couple of plants. That it gets leveraged up because of the risk.

That's actually the figure that we've concluded coincidentally, independent of you. The first couple plants are probably going to cost 30 percent more in terms of capital investment. The next two are probably in the 15 percent range. And if successful now you're down to probably the $60 million figure that you were looking at, or the $60 million on a 20- to 25-million gallon plant. And that's normal in any new technology in terms of spreading the risk and the cost of that.

But, a low interest loan would also help spread that risk. And I think the policy question, now that we know the Governor is a policy maker, the policy question for really the Governor in the state, and the Legislature, is are there enough public benefits to justify some subsidy in some form, kick-starting this new industry.

And, if so, how do you value them? And I think you've laid a good framework here for identifying what the barriers are. You've laid some alternatives out in terms of what could be done to kick-start the industry.

And I really think it's your job, the Governor's job, and the Legislature's job to determine if the public benefits justify starting the industry.

I think it's really the industry's job to respond to that if there's a desire to do it, as to what it will take.

And I want to again emphasize you didn't hear, I think as the biomass power plant industry has tried and proven that a direct subsidy on feedstock really doesn't make sense. It's not political sense anyway.

And I think you've heard from the industry that the need for assurance of a market and low interest loans would do it.

So, with that, I'll let everybody go to eat.

MR. PEREZ: Thank you very much, Mr. Forrest.

Is there anybody else out there? If not, I'm going to give an opportunity to my colleagues up here if they have any questions of any of the presentations today. I give you an opportunity of any outstanding questions. I know we have a lot to digest here and work with, but give you an opportunity --

DR. SCHARFF: Well, I have one. I'd like to ask some of the people who spoke and mentioned a little bit about co-products, the value of those and their role, and/or the complications they introduce, either for getting financing or for developing the markets, to add a little bit to what they have said.

I'd like to hear a little more about the role of co-products, good or bad, and how it might be quantified, please.

DR. KATZEN: I'm going to be very negative. To get the industry started, forget it. Burn the residue, tie in with the cogen plants and your own boilers.

When you talk about co-products I look at markets. The gentleman mentioned citric acid for Arkenol. That's a wonderful product. They go into head-on competition with ADM, European producers, and how much more citric acid can you put on the market compared to ethanol.

A few projects will do it. Not massive. Remember, we're talking about for California to produce 3 billion gallons a year of ethanol.

The same with lignin. I'm a lignin expert, I was, I finally said, oh, forget it and burn it.

Again, there are markets that are very valuable, very limited quantity. So no basic industry plannings are based on the co-products. First, the primary product, dispose by combustion or other disposal, fertilizer, what-have-you, your ash. It's a wild goose chase to chase that byproduct that's going to make you profitable.

There will be exceptions like Arkenol, but very few. Thank you.

MR. ALLEN: I'm one of the people that mentioned co-products. While co-product development now is clearly at the periphery of energy development in terms of biomass, and there are no clear success stories to be told or even on the horizon, I don't think that we have the right or the practical option of excluding other products outside of energy.

I think the programs that we're talking about now have to be built around energy, but I think that we always need to have the vision to look for other products. And there may be other products that are dreamed of or invented that have nothing or little to do with energy.

We cannot exclude them. We're talking about a huge waste disposal situation, a huge waste disposal problem in the State of California. And I think we ought to keep all our options open.

Coming from the energy industry I would like to be selfish and say, no, we should just talk about energy. Practically, we should just talk about energy. But, realistically and fairly we need to keep options open.

And I think these options will develop themselves. And if they don't, they don't. I don't think we have the option or the right to say no other products but energy should be considered under any policy.

MR. PEREZ: Thank you.

MR. MILLER: Rus Miller again for the recorder there.

Just to clarify my earlier comments, Arkenol is not considering that citric acid is a co-product with ethanol. It's the main product of the plant now. Ethanol is the co-product, okay.

Do the math. I told you citric acid is worth three to five times as much per pound, and we're making twice as much sugar into citric as ethanol. And that's been driven by the economics I mentioned earlier.

But, I cautioned you then that the reason I was telling you that story was to explain more to Tom MacDonald why it's gone from 12 to 4 million gallons a year of ethanol. But to caution you not to buy into some of the things that are in your appendices about doing the fantastic things with succinic acid or gallic acid, and if you would like I can go on for about 15 minutes about things you could do.

If you want to have a biomass policy to convert the 50 million tons or 35 million tons a year that's reasonably available or whatever percentage of that that you would like, you have got to convert it to ethanol for fuel. There is just no other sink large enough in the world to use that much tonnage of material for a chemical.

Citric acid is one of the more substantial commodity chemicals that you can -- it's a carbohydrate chemical, world market is 800,000 tons, the growth is 3 percent per year. Do the math, that's one Arkenol size plant a year worldwide. And we do have to compete with ADM, Cargill, Roche, and all the miscellaneous guys inside Russia and China.

Now to maybe answer Mr. Scharff's question a little more directly, the co-product that you can get are lignin. And I could regale you with all sorts of stories about how lignin is this very complicated molecule with all sorts of wonderful things, and you could theoretically convert it to more fuel than you could the cellulose fraction of a tree. That's mostly baloney.

I can do that in a laboratory. A hundred guys can do that in a laboratory, but it's not economical. The conditions required to make the conversions are too difficult today. A lot of people working on it really hard, but Ray's got it right now, you do the math, you sell it to somebody to burn it today. Maybe in the future we get there.

I have extensive contacts with the Russian Hydrolysis Industry. They've got 40 plants been running for about 50 years. They burn all their lignin. They got no idea what to do with it.

With the exception they have one pharmaceutical product that they use about, you know, one ton per year for, out of the, you know, 50 million that they make. Trivial.

The other product from an acid hydrolysis business is gypsum, road base, you know. If you get $3 a ton, you've scored a home run. Not valuable.

Arkenol's process in Sacramento because rice straw contains 10 percent silica. It just works out that you can extract the silica pretty readily from the material after Arkenol's done taking the cellulose out of it. So we're going to make precipitate silica. That's got a pretty good value, pretty substantial market around, as well.

But most biomass materials don't natively have silica in any substantial quantity. Rice straw does because that's how rice straw can stand in the water and not fall over. But most of the stuff we're talking about doesn't do that.

So, the other thing which is carbon dioxide. Sure, I'd like to sell carbon dioxide, but there are three CO2 plants in the San Francisco Bay Area. And each one of them has the capacity to meet the entire requirements of the State of California, Oregon and Nevada. So they're beating the crap out of each other already.

(Laughter.)

MR. MILLER: Don't need to go there. Does that kind of answer that question?

DR. SCHARFF: That was very helpful.

MR. MILLER: More detail than you wanted?

(Laughter.)

DR. KATZEN: Another comment. I'm not saying ignore, just don't base your policy on them. Private industry is doing a job. -- with DuPont. Part of it is public so I can speak to it. To convert biomass sugars whose novel organisms, they working with -- been publicized, to make what used to be petrochemicals. Particular one is propane diole, when polymerized makes a better carpeting than nylon. It's in the research and development stage.

People like DuPont will develop these lines. These are not byproducts, these are main products just like citric acid for Arkenol.

But you might talk about it in a few years, a few hundred million pounds a year. Maybe eventually a billion pounds a year. We're talking about 6 billion pounds of ethanol for California, alone. There's your market.

MR. PEREZ: Okay. Thank you. I believe that is going to --

DR. SCHARFF: I have one more --

MR. PEREZ: Mo, you've got a --

DR. SCHARFF: I was going to give them a chance, but I have one more if --

MR. PEREZ: One more.

DR. SCHARFF: -- on behalf of my compatriots, they've had their chance.

MR. PEREZ: Okay, first let me check with my other colleagues down there. Were there any other questions down there?

No. Mo, please proceed.

DR. SCHARFF: Okay, this one could be controversial, but then you'll have something to take home with you.

We would certainly receive some comments in writing that to put it kindly, the report seems to understand the situation with the agricultural wastes and forest wastes better than it does with municipal solid waste.

So, I'd like to ask either or both of Kay Martin and Darrell Harms to give a few comments to help improve our understanding of MSW as a potential source.

MR. HARMS: I'm Darrell Harms, CEO of MASADA OxyNol. We are based in Birmingham, Alabama. We don't have a dog in this fight. We don't have any projects in California.

We do have a project in New York that we have been developing over the last five years. I think that I can give a status report on it. It's a solid waste project.

We have entered into 23 municipal contracts with cities in New York about 45 miles from New York City. We're constructing a plant that has 230,000 ton municipal solid waste capacity; another 360,000 tons per year of wastewater biosolids and sewage sludge capacity.

We are supported by Wall Street. We have experienced broad environmental support. We are supported by the National Resources Defense Council, by the Environmental Defense Council, by the Institute of Local Self Reliance, to name a few, and the Riverkeepers, as well.

We have been through over 300 public hearings in New York State. And I can report, as of a couple of weeks ago, that we have been deemed complete in all of our environmental permitting for the project.

We recycle or convert to beneficial use over 90 percent of the waste stream that comes into our plant.

I'd like to contrast what we're doing a

little bit more visually perhaps than what some of the issues that have been highly technical, talked about today here.

And I'd ask you to close your eyes, if you don't want to do that, you can just imagine with me. Our primary competition, because it's nasty, it's got rats, it's got seagulls with parasites, they're diving everybody that walks out there, they've diving the people trying to climb over the fence and extract the stuff out of the landfills. The runoff is unknown; the leachate is unknown. Whose water supply, whose aquifer it's getting into.

We're in the waste disposal business. We provide hard disposal contracts, permanent disposal to municipalities. And in contrast I'd like to offer an opposing position to Mr. Hoekman at Chevron. The typical landfill that would handle the amount of waste that our plant processes will emit 480 tons of VOCs per year. Our plant emits 21. That is a dramatic improvement for the deployment of ethanol in this business.

But it's been a long tough road to develop that project. It has been five years, having financed over a billion dollars worth of projects in the UK, and being an American, and not being able to find UK funding or American funding, and secured funding out of China to develop infrastructure projects in England, I can tell you this one's even tougher.

It's got to be done by entrepreneurs. There are no public companies that have any earnings-driven dynamics on them that are going to tolerate the kind of development risk and development cost of one of these projects.

So I commend many of the recommendations that have been made by representatives of BCI and Arkenol on the request to the state for loan guarantees. That absolutely would be beneficial in their projects, I'm sure.

But I've got some good news and some bad news, and some of the battles that we've been through over the last several years. Let me give you the bad news first. The bad news is that the capital cost is dramatically greater than what anybody is anticipating.

The second part of the bad news is the financing is dramatically more complex than what anyone is giving credit for.

Now let me give you the good news. Because the good news is that there are phenomenal environmental benefits to what we're doing. And in our business model there are very compelling business economics.

Now, while our plant cost well over $200 million to build, it also generates over $50 million a year in revenues. And of that, over 70 percent of it comes under municipal guaranteed contracts. We don't ask any municipalities to take any risk. Their only obligation is to guarantee us their waste stream and to guarantee they'll pay for it, period.

Before I commend you on the report, since I was part of the peer review group, I realize when I point a finger there are four or five coming back toward me, so I will try to do it gently, least I injure myself.

I really question the methodology with which you've incorporated to analyze the MSW and sludge to ethanol programs. And I would offer our help in providing some more data that might allow a different perspective to be taken.

Specifically in the method of breaking down subcategories of the operation within a MSW sludge ethanol facility. I think it's dangerous to break apart -- it's dangerous for a number of reasons, many of which are legal and technical, to be able to identify potentially valuable commodities somewhere within the process without looking at it from a front-end to back-end process.

And specifically I'm speaking to the solid waste exclusions under the revenue code, to insure the availability of taxes and financing.

I think there are four areas that I would ask the state to consider, none of which are probably quite as painful as some of the requests that you've had today. There are actually, I think, some of them you wold find we would be more than happy to help in public opinion polling to support this, but I think that you would find that the inclusion of biomass-to-ethanol conversion to beneficial use as a state diversion credit to be something that would be very complementary to this budding industry.

Secondly, I would hope that the state would consider, and appropriate agencies would consider the banning of siting or expanding in new landfills without a biomass-to-ethanol consideration before such permitting was issued.

Of course, maybe there are political people in this state that really like landfills, but I haven't been able to find any in some other states.

Thirdly, I would request that you ban the land application and landfilling of wastewater biosolids and sludges, again, without a biomass-to-energy consideration alternative.

I think you'll find with the heavy metals content and the passing content of the sludges that are being land applied, and the unknown destination of those applications, that this will be a well perceived policy.

And fourthly, I would suggest that there be a review of the policies that would allow the co-collection of source separator recycle. That the existing curbside recycling programs be promoted, be developed, continued developed, but one-stop co-collection be absolutely permitted.

This results in the ability for a municipality to consider collection and disposal costs in integrated capacity versus just disposal costs. It enables this industry to be looked at very favorably from a pure cost standpoint to a municipality.

That concludes my comments. I appreciate the opportunity to be here. It is a fabulous report. Like I say, except for that one point that I have. So, thank you very much. If you have any questions I'd be more than happy to answer them.

MR. PEREZ: Thank you, Mr. Harms.

DR. SCHARFF: Thank you.

MS. MARTIN: Out of respect for everybody's rumbling stomach I will be very brief. My name is Kay Martin, I'm Director of Solid Waste Management for Ventura County. And also serve on the peer review group for this report.

I, too, would like to congratulate staff on a good job, and I've had conversations with many of you, and probably will continue to do so.

With regard to solid waste management and solid waste as a feedstock for this growing industry, I think it has very unique qualities that need to be elaborated in subsequent drafts of the report.

I would emphasize that California is a major producer of solid waste. One looked at the nation as a whole, about 65 percent of the solid waste stream is biomass. And so we're speaking here of more than waste paper. We're looking at food waste, fabrics, yard wood waste, a whole variety of materials that aren't currently being picked out of the waste stream.

And so if you go to the face of a landfill you're going to see a great majority of the material that's currently being buried is biomass, and is potentially recoverable.

I would emphasize that unlike all of the other feedstocks that you consider in your report, solid waste has an existing infrastructure for collection. And for, to a certain extent, preprocessing that's already paid for. Much like a public utility.

And so the costs of collection and preprocessing really don't need to be factored into ethanol production costs for this particular feedstock.

We have throughout most of California a trend toward the closure of urban landfills and the regionalization of more remote rural landfills. And what this means is that the majority of our waste stream is increasingly being collected and transferred through centralized collection points called transfer facilities or material recovery facilities.

And the reason this is significant potentially for the development of this industry, is that we have already the centralization of these materials in great quantities for transfers to other sites. And this provides a potential co-location scenario for ethanol plants.

And what I would like to see in the draft is the modeling of a co-location scenario, not only with biomass-to-energy plants, but a co-location scenario with a solid waste material recovery facility. Because this is a very viable option for siting of the initial plants.

In that scenario the biorefinery simply forms a partnership with the MRF operator. Very often the MRF operator is also a collector of solid waste. And within California, collectors of solid waste very often are franchised. And so they're in a position to guarantee the feedstock for a substantial period of time.

So we have a number of very favorable elements coming together. in that scenario the biorefinery only has to compete with the landfill costs. And so when he comes to the MRF operator he only has to be able to beat that operator's cost for handling the material, putting it in a transfer truck, and taking it to a landfill.

And so depending on the region, this could be an opportunity for the refinery to recover on the front end a tipping fee of say $15 to $25 a ton. As opposed to having to pay for the feedstock.

And this is the reason why I would really like to see in the final report a separate modeling of a scenario in which we have perhaps not only a zero feedstock cost, but a negative feedstock cost of substantial proportions.

And as you know, feedstock cost has a tremendous impact on the ultimately production cost of ethanol.

In addition I would like to express my pleasure that the draft report has included a recommendation that the Integrated Waste Management Act be modified in order to provide full diversion credit for the production of useful products from biomass-to-ethanol.

And I think this is absolutely essential in order to provide sufficient incentives on a local level to provide feedstock to this industry.

Thank you very much.

MR. PEREZ: Thank you, Ms. Martin. Okay.

DR. KATZEN: I have to speak on this one. The Katzen Group has been involved with two projects -- third one. Starting with Gulf Oil Chemicals more than 20 years ago, a wide variety of feedstocks were investigated for conversion by pretreatment and then enzymatic conversion.

Municipal waste collection was obviously the best target because it's collected for you. However, one investigating these facilities, particularly separation plants, the extremely variable nature of the material, locally, seasonally, is quite a problem. And I contest the high percentage of sales. It's less than 50 percent. Or more plastics are showing up year by year.

Now, if you want to get the tipping fee you got to take the raw garbage. In order to get the tipping fee you take the raw garbage, and you put it in the separation plant. The won't pay you a tipping fee if they separate it. Because you'll have to pay more for it after they separate it. That's the facts of life.

Gulf is very pleased with the research of this project, went right through the pilot plant stage. But finally gave up on dealing with municipalities, and I'll tell you why in another minute, because the second project was designed biofuels in Virginia, Richmond, Virginia.

Put several million dollars into trying to develop an operation in Richmond and nearby communities, like 1500 tons a day of waste, and do the processing.

They found dealing with these 15 municipalities for assured long-term supply was just about impossible politically. Commissioners or whoever runs the thing in different municipalities were afraid to make a ten-year commitment. They'd be kicked out of office for giving away the store.

The project started, was working here in Gridley before BCI took it over, worked first in biomass. They told me they gave up on this question of collecting from municipalities.

This gets back to what Loyd Forrest said, it's the financial people who control. If you can't show a guaranteed supply, a guaranteed quality, and a guaranteed price, whether it be a tipping fee or a positive price, they will not even look at financing.

And that is the biggest problem. DOE has spent a lot of money on research and development of municipal solid waste. And as far as we can see, the last few years they just sort of put it aside. Maybe I'm wrong, but this is what we see happening.

So, it's one of the ideal situations, in the New York area you could pick up 50,000 tons a day, the New York metropolitan area. Sounds like a wonderful spot to go.

We took a look at a project with possibilities in New Jersey. Some project -- $250 million investment, cogen and all. But again, we got stuck on this assured supply, assured availability.

And there's these local interests, depending who's running the collection system. Some places it's not very reputable people. And could not compete with them.

So, it's a wonderful idea. We haven't seen any reality approaching even the real pilot facility -- thank you.

MS. MARTIN: Let me just respond very

briefly. With regard to the feedstock quality, itself, I'm not speaking here of mixed municipal solid waste, I'm speaking of material recovery facilities that do an initial sort, pulling off the most valuable commodities into existing commodities market.

And we're talking about the residual that comes off the back of these sort lines. We have looked at it, we've analyzed it, we've discussed this with MRF operators. And the notion is, particularly with MRF operators of large facilities in southern California, their attitude is give us a spec and we will deliver you the material within this range of spec.

And so it's down to that level of sophistication, I believe, at these large MRFs. And they can supply a feedstock that's suitable.

Secondly, with regard to feedstock guarantees, we have a rather unique situation in California and that is the franchise system. Most of our franchised haulers have long-term contracts with municipalities, and so they are indeed in a position to provide the feedstock on long-term guarantees.

MR. PEREZ: Okay, thank you. I believe

that's going to wrap up our session.

What I'd like to do is just discuss for a moment where we go next. As I mentioned earlier, I have received a number of comments here which we will mail out to all of you.

I probably will not send this out to you until late next week. And the reason for that being is we're going to be receiving quite a few more comments. I've probably received a few this morning, as well as I have comments coming in probably Monday or Tuesday from the Governor's Ethanol Coalition, and other Midwest parties. And I'd like to just put it all in one big package and then send it out to you.

One of the things we're also looking for, if you could not provide oral or written testimony today, we'd like to receive your input next week by Friday, to best help us in putting together and turning around this draft, which we need to release to the public October 22nd. So, again, we're on a very tight tight schedule.

And we want to make sure that we consider and incorporate and review any comments that all of you have. So, I would encourage you to send those to me. And I will put my address up here, email address, if you don't already have it.

Okay, good. It's also on the cover letter. And, again, I want to thank the peer review group that has helped us throughout the development of this draft report.

And each and every one of you for your input today. This is very valuable. Also, I appreciate your patience. We've gone four straight hours on this without a break. I do appreciate your attention and your ability to listen to one another on this.

I've certainly gained a lot of new information and insight on this topic area through the discussions we've had today, and I'm sure all the staff here feel the same way about that.

And, again, I want to thank you. And we'll be holding a more formal public hearing probably around November 19. That date may change, but you can also access our website to get the latest updates. And now that I have all of your names and addresses, we'll add it to our overall what we call ethanol stakeholders list, so that you'll get any material that we release, including hearing notices.

So, with that, if there's not any other

comments, I'm going to go -- one more.

MR. CHILCOTE: An announcement.

MR. PEREZ: Announcement, okay.

MR. CHILCOTE: Western Biomass Consortium Conference is in Rocklin next week.

MR. PEREZ: I will --

MR. CHILCOTE: Because you fellows are going to be one of the workshops, so.

MR. PEREZ: I'm on one of the panels, I guess, so we'll see you there.

Any other public announcements?

Okay, with that, we're going to adjourn the workshop. Thanks again for coming.

(Whereupon, at 1:05 p.m., the workshop was adjourned.)

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CERTIFICATE OF REPORTER

I, DEBI BAKER, an Electronic Reporter, do hereby certify that I am a disinterested person herein; that I recorded the foregoing California Energy Commission Workshop; that it was thereafter transcribed into typewriting.

I further certify that I am not of counsel or attorney for any of the parties to said Workshop, nor in any way interested in the outcome of said Workshop.

IN WITNESS WHEREOF, I have hereunto set my hand this 16th day of September, 1999.

DEBI BAKER